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Soils of the Nazko area, British Columbia

Report No. 38 British Columbia Soil Survey 1988

Canada

Soils of the Nazko area, British Columbia

Report No. 38 of the
British Columbia Soil Survey

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Land Resource Research Centre
Contribution No. 85-55

(Map sheets 93B/NW and 93G/SW)

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Cover photo: Logging trucks at Nazko
(photo by D. Moon)

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PREFACE

This report and the soil maps it contains [map sheets 93 B/NW (Nazko River) and 93 G/SW (West Road River) in the National Topographic System] cover about 745 000 ha lying west of the Fraser River and west of the city of Quesnel. Ed Wiken conducted the soil survey and established the capability classification for agriculture on the West Road River map sheet; Ken Guthrie was responsible for the survey and agriculture capability ratings on the Nazko River sheet.

The report describes the characteristics of the soils and map units and specifies their location and extent. It gives short accounts of the history and natural features of the map area. The soil maps show the distribution of the soils. The soil survey was undertaken to provide an inventory of land capabilities through the Canada Land Inventory (CLI) program. Land capability maps for the sectors agriculture, forestry, wildlife (ungulates and waterfowl), and recreation, were published during the 1970s. Manuscript soil-and-terrain maps at a scale of 1:50 000 covering this map area and surrounds are available from the B.C. Ministry of Environment.

This publication is one of a series (Soils of the Lac la Hache - Clinton Area 1980; Soils of the Quesnel Area 1982; Soils of the Horsefly Area 1984; Soils of the Barkerville Area 1985 and reports in preparation for the Taseko Lakes Area, the Canim Lake - Bonaparte River Area, and the Williams Lake - Alexis Creek Area), covering the Cariboo-Chilcotin region. These publications provide soils information in maps of the region at scales of 1:100 000 or 1:125 000, with legends, and textual descriptions in which simplified map units, extended map legends, and simple map unit symbols are used.

GENERAL DESCRIPTION OF THE AREA

Location and extent

The surveyed area (Fig. 1) is on the Interior Plateau of central British Columbia. The area extends from 52°30' to 53°30' north latitude and from 123° to 124° west longitude, comprising an area of 745 380 ha. The communities of Nazko and Punchaw lie in the central and northeastern part of the map area respectively. Nazko is about 75 km west of Quesnel and Punchaw about 60 km southwest of Prince George. In 1975 the population of the Nazko area was around 425.

History and resources

Alexander Mackenzie crossed the continental divide on June 12, 1793. Arriving on the banks of a river the Indians called Tacoutche Tesse (now the Fraser) he became the first white man to find a way to the Cariboo. The Carrier Indians proved to be friends and allies as well as, at times, a formidable foe. With the major exception of Simon Fraser who introduced the fur trade in 1808, there were few settlers in the Nazko area until the Cariboo gold rush of 1859.

Subsistence ranching and farming have been and will probably continue to be, part of the economy of the area, but they are for the most part carried out by people who are interested mainly in the lifestyle of the country.

Forestry and related lumbering activities give most of the employment in the area. Processing is centered at or near Quesnel where lumber and planer mills, chip and pulp mills, and plywood plants are located.

As a consequence of the improved access provided by logging activities, much of the plateau country is now accessible by gravel roads. Fishing, hunting, hiking, camping and boating are pleasant and available recreational pursuits. Ice fishing, snowmobiling, and cross country skiing are winter time activities.

Physiography and drainage

The survey area lies on the Interior Plateau (Fig. 2). It contains portions of the Fraser Plateau in the south half of the map area and the Nechako Plateau in the extreme northwest. The Fraser Basin includes the valleys of the West Road, the Nazko, and the Chilako rivers (Holland 1976). These drainage systems, for the most part, are of low gradient and lack the steep-sided

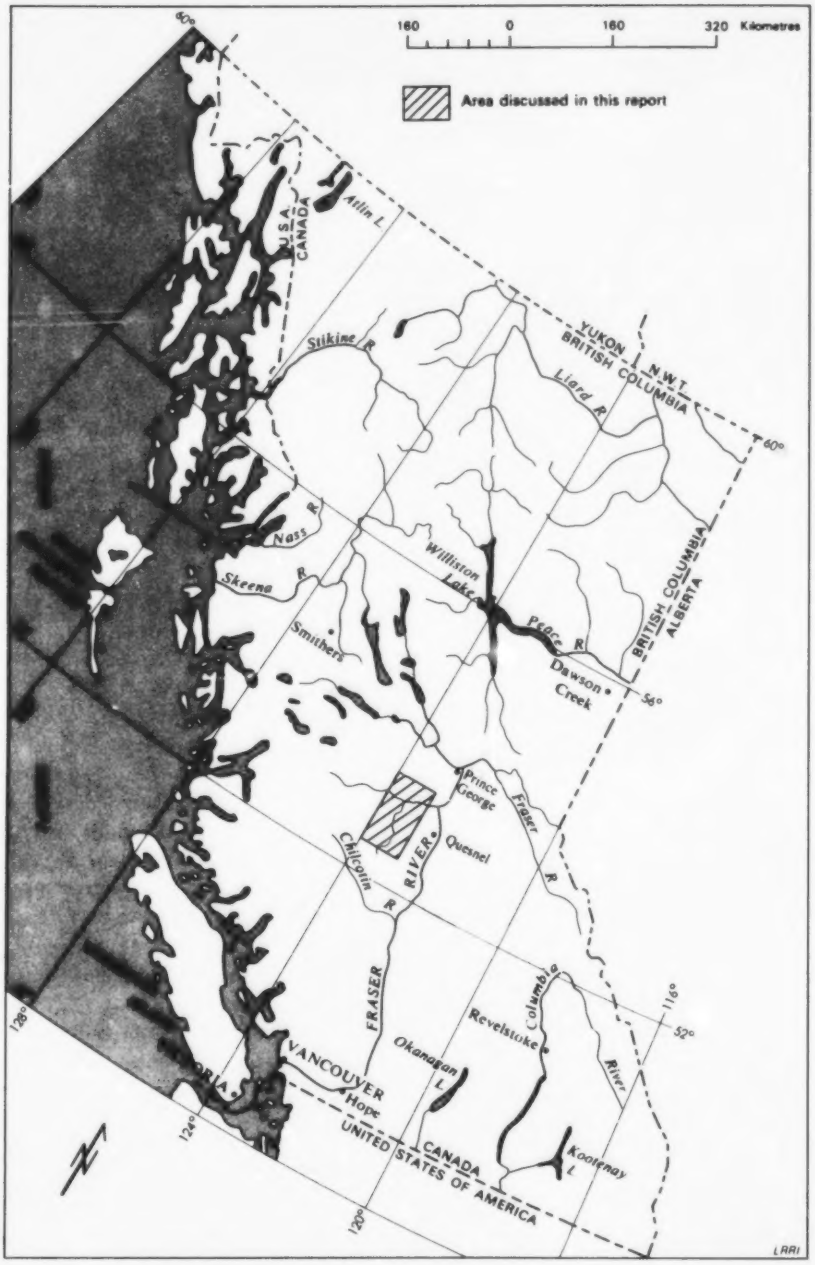

Figure 1. Location of the Nazko map area in British Columbia.

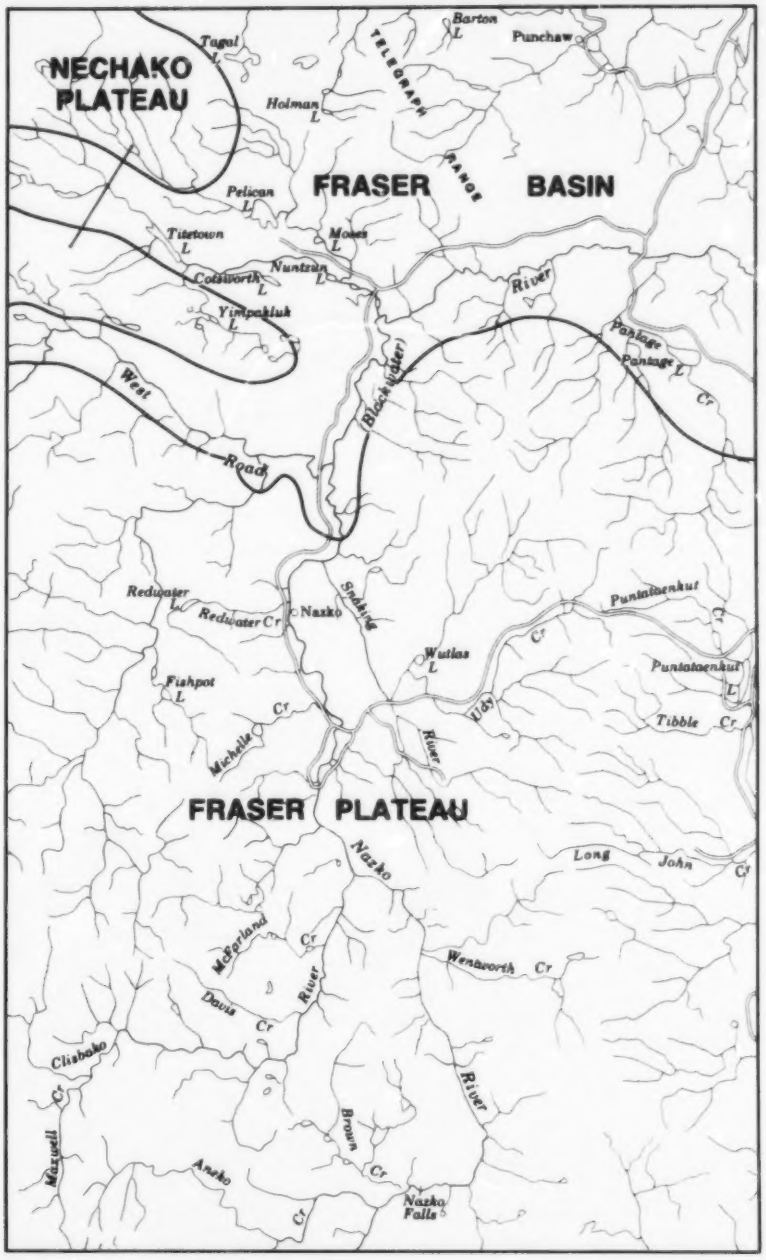

Figure 2. Physiography and drainage. Map scale 1:600 000

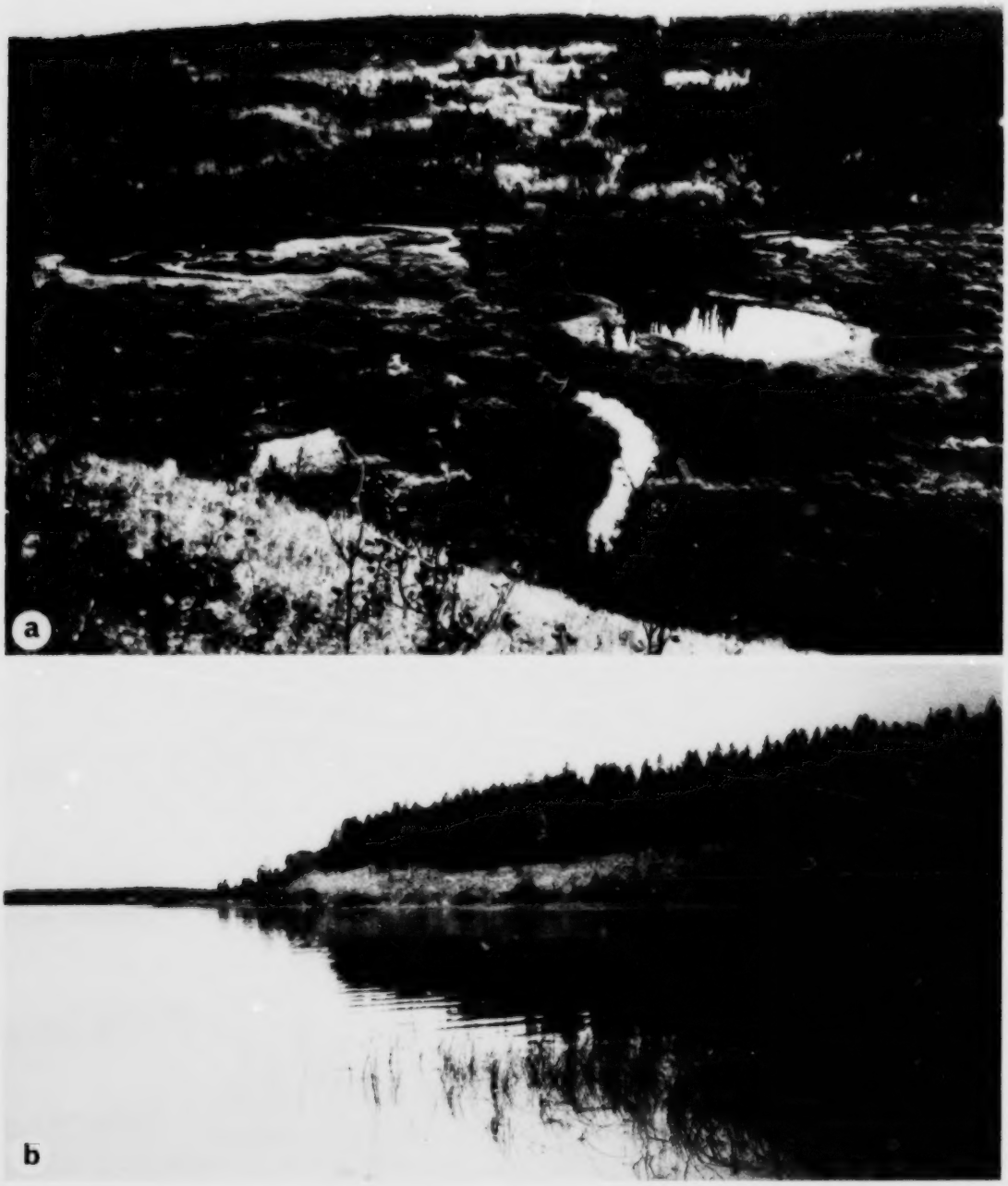

Plate I

(a) The upper Nazko valley near Tzazati Lake (credit Ray Coupé)

(b) Cottonwood soils bordering on Pelican Lake

Plate II

(a) Wetlands in the Nazko area (photo credit D. Moon)

(b) Haying crew at Tsetzi Lake (photo credit "Province of B.C.")

(c) Haylands on Stellako soils (photo credit D. Moon)

canyons which are more characteristic east of the map area. The Telegraph Range separates the map area from the immediate Fraser drainage to the east. This range is breached by the West Road River, or Blackwater which flows east into the Fraser and by the Chilako River which flows north into the Nechako River.

The numerous fields of drumlins and eskers provide a rolling ridged surface form to the widespread and deep mantle of glacial drift on the Fraser Plateau. Th elevations range from approximately 800 m at Punchaw Lake to 1550 m northeast of Cantillon Lake. The Nechako Plateau, of minor extent in the map area, has elevations of 1000 to 1300 m. In general, it is an area of low relief, with broad expanses of flat or gently rolling topography and a surface covered extensively by drumlinized glacial drift.

The Fraser Basin, an area of low relief in the north part of the map area, is drained by the West Road and Chilako rivers. Its boundaries are near the 920 m contour and include deposits of former ice-dammed glacial lakes, glaciofluvial materials, and morainal deposits. Early geological investigations (Lay 1940, 1941) indicate that the basin was eroded by an ancestral Fraser River flowing northward into the Peace River.

Disruption of drainage during the Pleistocene and the generally low relief over much of the plateau surfaces have left a landscape that is dotted with numerous bogs and small lakes. This is particularly evident in the Euchiniko and Clisbako river areas. The major lakes are Pantage, Pelican, Titetown, Tagai, Kluskoil, Batnuni and Puntataenkut. Drainage is by way of the Nazko, West Road, and Chilako rivers which trend north prior to joining the Fraser or one of its tributaries.

Bedrock geology

Figure 3 shows the bedrock geology as generalized from mapping by the Geological Survey of Canada (1959, 1960). It illustrates the location and extent of the various bedrock types and unconsolidated sediments in the survey area. However, outcroppings of bedrock are rare. By far the most extensive surface materials are unconsolidated sediments. The Fraser Plateau is underlain largely by gently dipping olivine basalt flows of the Miocene or Pliocene era. The Nechako Plateau however, has Tertiary lava flows which cover the older volcanic and sedimentary rocks and intrusive rocks of Upper Jurassic and Cretaceous age. A small Tertiary volcanic dome lies south of the community of Nazko. The Fraser Basin is largely an erosional feature characterized by extensive glacial deposits and few bedrock outcrops.

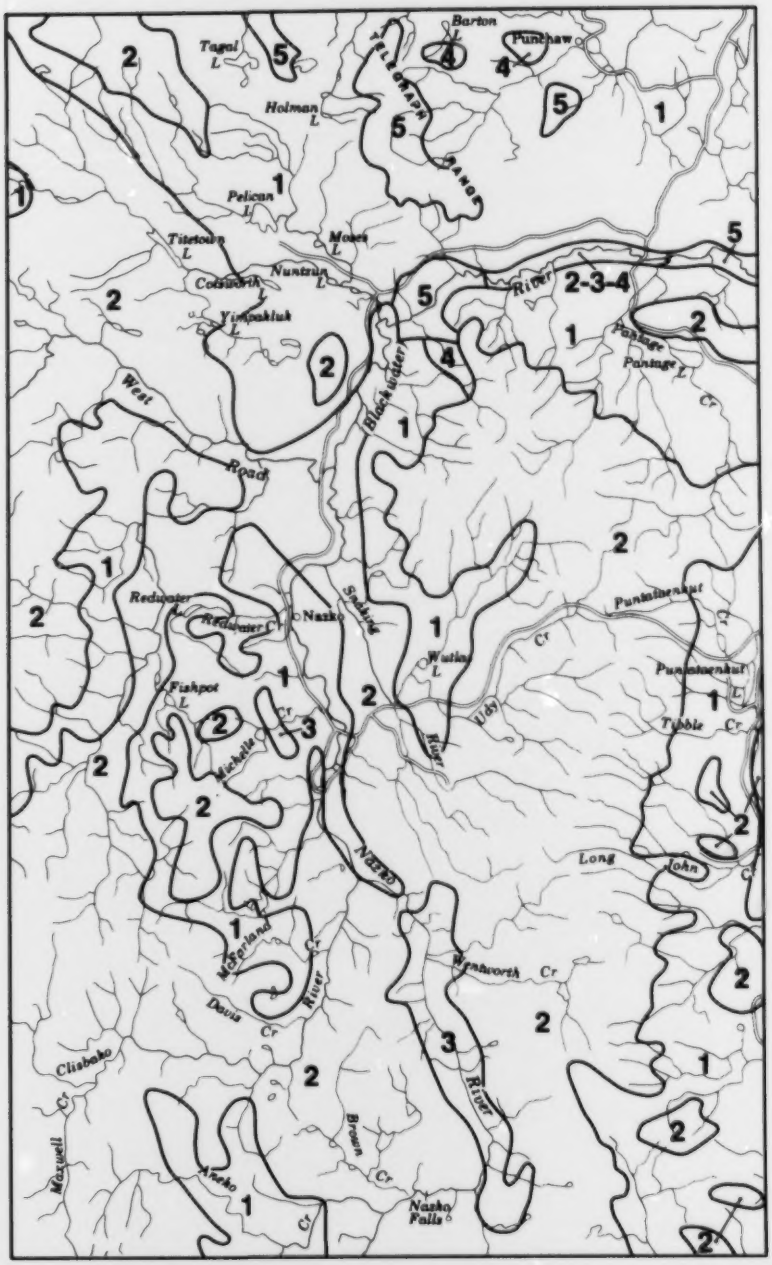

Figure 3. Generalized bedrock geology. Map scale 1:600 000

1 Unconsolidated sediments
2 Volcanic rocks
3 Sedimentary rocks
4 Intrusive rocks
5 Metasedimentary rocks

Surficial geology and soil parent materials

Tipper (1971) has discussed and described the glacial geomorphology and Pleistocene history of central British Columbia in a comprehensive report. The purpose of this section is not to repeat his description but to describe the relationship between these surficial deposits and the parent materials of the mapped soils. Figure 4 provides an overview illustration of the direction of glacial ice movement in central British Columbia (Tipper 1971) and Figure 5 illustrates the general location and extent of surficial geologic deposits (classified according to the Canada Soil Survey Committee 1978). While there are definite chemical and physical differences within each of the main surficial geological material types, the remainder of this section describes, in a general fashion, the significant attributes of each group.

Fluvial deposits

Adjacent to present-day river systems, there are extensive terraces and floodplain deposits. These fluvial deposits vary in their extent and mode of formation but are generally found below 600 m and characteristically exhibit level to gently sloping topography. Terraced deposits are usually separated by steep escarpments. As a consequence of their varying mode of formation, fluvial parent materials can exhibit a considerable range in surface textures. However, for the most part, the textures range from loam to loamy sand. Fluvial deposits are parent materials for soils of the Stellako and Elliot associations.

Glaciofluvial deposits occur throughout the map area and are often in close association with morainal deposits (glacial till) at their higher elevations (800 m to 1000 m). A variety of landforms occurs, associated with recessional glacial ice as well as esker-kame complexes. Where these deposits are in association with morainal deposits, they are often thin veneers overlying morainal ridges or thicker deposits between drumlin ridges. The textures of the materials generally range from gravels to gravelly sands and gravelly loamy sands. Coarse glaciofluvial deposits are parent materials for the Alix, Roaring, and most Salt Lake soils. Cottonwood soils are developed on loamy and sandy materials of glaciofluvial or glaciolacustrine origin.

Lacustrine deposits

In basins centred around Prince George, Fort St. James and Vanderhoof, ice-dammed lakes formed during late glacial stages and resulted in the deposition of glaciolacustrine sediments up

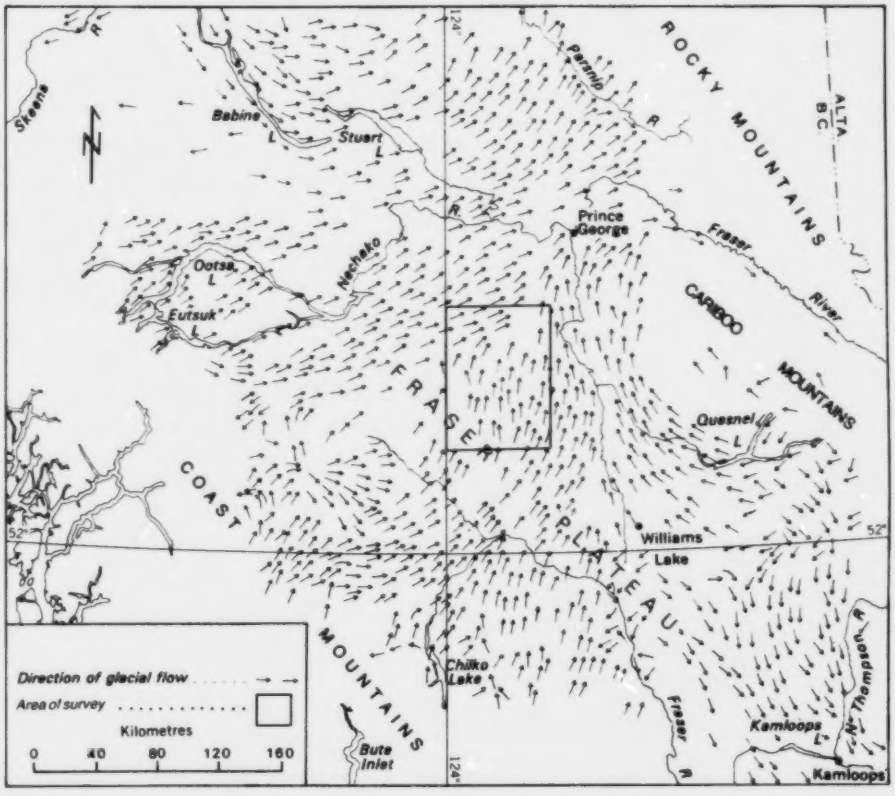

Figure 4. Direction of ice movement in central British Columbia.

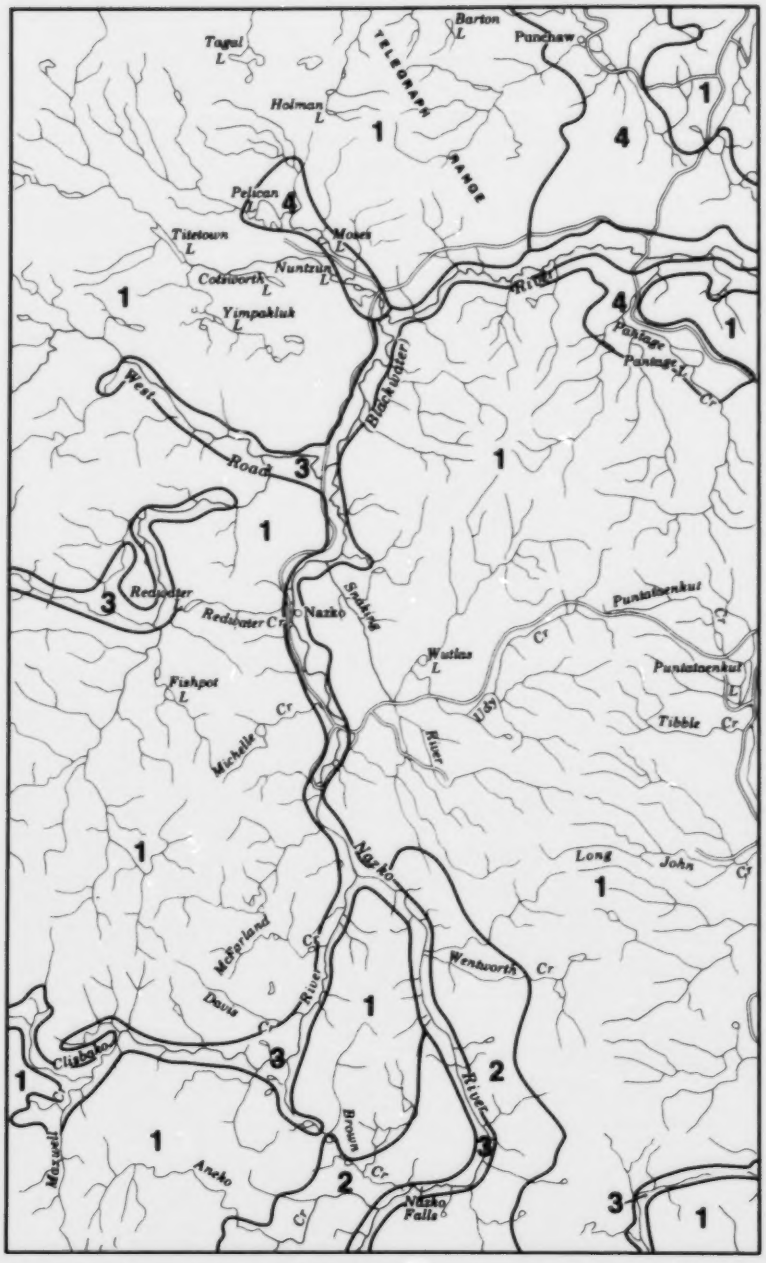

Figure 5. Generalized surficial geology. Map scale 1:600 000

1 Basal moraine
2 Ablation moraine
3 Fluvial and Fluvioglacial
4 Lacustrine and Glaciolacustrine

to an elevation of approximately 800 m (Tipper 1971). The map area includes part of the southern extent of these large glacial laking basins.

Glaciolacustrine sediments are parent materials for the Beaverley and Vanderhoof associations. The predominant textures of these sediments are clay loam to heavy clay. On the extensive plain north of the Blackwater River, sandy and loamy glaciolacustrine and glaciofluvial sediments are parent materials for Cottonwood soils.

Morainal deposits

Morainal deposits of till, the most extensive surficial materials in the area, occur mostly above 750 m. At their lower levels, the deposits often occur as islands protruding above the general level of the glaciolacustrine or glaciofluvial sediments. Landforms are commonly well- to poorly-defined drumlins as well as crag-and-tail features where the till is a thin veneer overlying bedrock.

Two types of morainal materials are recognized. One type, a compact, pseudoplaty-structured deposit occurring throughout the area, is described as a basal till (Deserters and Barrett associations). The other type is a loose, sandy loam to loam-textured material displaying evidence of reworking by fluvial action. These deposits, parent materials of Salt Lake soils, are likened to an ablation till and result in coarser textures and a higher coarse fragment content (Salt Lake soils may occur on this material as well as on glaciofluvial parent materials).

Other soil associations representing morainal parent materials are recognized and differentiated on the basis of climatic characteristics as well as texture and composition resulting from the influence of different bedrock sources. The influence of coarse textured intrusive rocks is apparent in the soils of the West Road Association. Finer-textured metavolcanic, metasedimentary, and volcanic rocks influence the Telegraph and Tyee soils.

Colluvial deposits

Soils developed from colluvial materials are highly influenced by the parent bedrock from which the colluvium was derived. Volcanic and metavolcanic bedrock forms the principal parent material of the Ormond Association. The Chasm soils tend to be sandy and loamy textured, slightly to moderately calcareous, and derived from intrusive bedrock.

Organic deposits

The rolling, subdued topography of the plateau surface in combination with the chaotic, often disoriented nature of the drainage pattern, has resulted in a multitude of small lakes, ponds, and organic areas. The buildup of organic deposits occurs in wet areas which support vegetation adapted to specific wetland environments. Relatively undecomposed to moderately decomposed, dominantly moss-derived peats predominate in deep meltwater channels and large, open basins with a relatively small fluctuation in the water table. Chief soils are characteristic in these areas. Organic deposits of moderately decomposed sedge materials with an admixture of moss tend to occur in shallower and smaller basins which generally have a sequence of soils grading from organic through peaty phase Gleysols to Orthic Gleysols (Elliot soils). The water table is generally drawn down during the summer growing season. Rail soils are dominant on these primarily sedge-derived peats.

CLIMATE

Given its location in the lee of the Coast Mountains, the map area experiences light precipitation, a high frequency of clear skies and therefore a relatively dry climate. Owing to its elevation the plateau areas also have a short freeze-free period.

The climate of the Cariboo forest region is described in some detail by Annas and Coupé (1979) as well as by data supplied by G. Cheesman of the B.C. Ministry of Environment (personal communication). Climatic data were collected over the area through a network of short-term stations and related to the few established long-term stations in or near the map area. These data are presented in Table 1. The data indicate that precipitation increases, freeze-free periods shorten, and growing degree-days are reduced as one proceeds west from the Fraser River. Snowpacks become deeper and more prolonged at higher elevations.

VEGETATION

Krajina (1969) and Annas and Coupé (1979) have described the vegetation and biogeoclimatic zones of the Cariboo Forest Region on a broad scale. For that portion of the map area which lies within the Prince George Forest Region, work has been undertaken by B.C. Forest Service staff. Two biogeoclimatic

Table 1. Selected climatic data

Station	Location	Elev. (m)	Mean temperature(°C) Annual	January	July	Mean precipitation(mm) Annual	May-Sept.	Growing degree-days[1]	Freeze-free period[2] (days)	Average annual snowfall (cm)	Climatic moisture balance[3] (mm)
Gillies Cross	5316 N 12331 W	848	2.2	-12.9	13.7	502	268	955	40[e]	-	-172
Nazko	5255 N 12337 W	900	2.3	-12.9	13.9	442	248	980	40[e]	-	-189
Puntchezacut	5300 N 12255 W	914	2.5	-12.3	14.3	518	300	970	61	178	-33
Alexis-Tautri	5232 N 12311 W	1220	0.4	-13.8	11.6	464	243	635	12	195	-265

[1]Growing degree-days: degree days accumulated above 5°C.
[2]Freeze-free period: days above 0°C.
[3]Climatic moisture balance: moisture deficit (-) or surplus (+).
[e]Estimate
Reference: Personal communication - G.E. Cheesman, B.C. Ministry of Environment.

zones occur in the map area (Fig. 6)*; a biogeoclimatic zone is a geographic area in a broadly homogeneous macroclimate. Zones are geographically subdivided into subzones on the basis that each subzone has homogeneous patterns of soil and vegetation distribution. In the map area are three subzones of the subboreal spruce zone and one subzone of the Engelmann spruce - subalpine fir zone. Botanical and common names of plant species used here are from Taylor and MacBryde (1977).

Subboreal spruce zone

Most of the survey area falls within the subboreal spruce zone. This zone and its three subzones cover most of the study area by far.

Of the three subzones, the cold, dry Chilcotin pine subzone (SBSa) has the greatest geographic extent. Here, white spruce (Picea glauca) and lodgepole pine (Pinus contorta var. latifolia) are the dominant coniferous trees with black spruce (Picea mariana) occuring in bogs. One of the key features of this subzone is the general absence of Rocky Mountain Douglas fir (interior Douglas fir) (Pseudotsuga menziesii). Generally, the herb layer is sparse, and pine grass (Calamagrostis rubescens) cover is variable.

The Douglas fir - white spruce subzone (SBSb) occurs in the northeastern part of the area, particularly in the Fraser Basin. Douglas fir, white spruce, lodgepole pine, trembling aspen (Populus tremuloides), and common paper birch (Betula papyrifera) are the dominant trees. The well developed shrub layer includes western thimbleberry (Rubus parviflorus), Oregon boxwood (Paxistima myrsinites), Rocky Mountain maple (Acer glabrum), and blueberries (Vaccinium spp.). Pine grass is usually sparse, but herbs such as wild sarsaparilla (Aralia nudicaulis), Canadian bunchberry (Cornus canadensis) and asters (Aster spp.) are common.

The cold, northern climate experienced at higher elevations in the Telegraph Range is represented by the white spruce - subalpine fir - Douglas fir subzone (SBSc). Generally, white spruce and subalpine fir (alpine fir) (Abies lasiocarpa) are the dominant trees. However, Douglas fir, lodgepole pine, trembling aspen, paper birch and black cottonwood (Populus balsamifera subsp. trichocarpa) are also common.

*D. Meitinger and A. McLeod, of B.C. Ministry of Forests (personal communication)

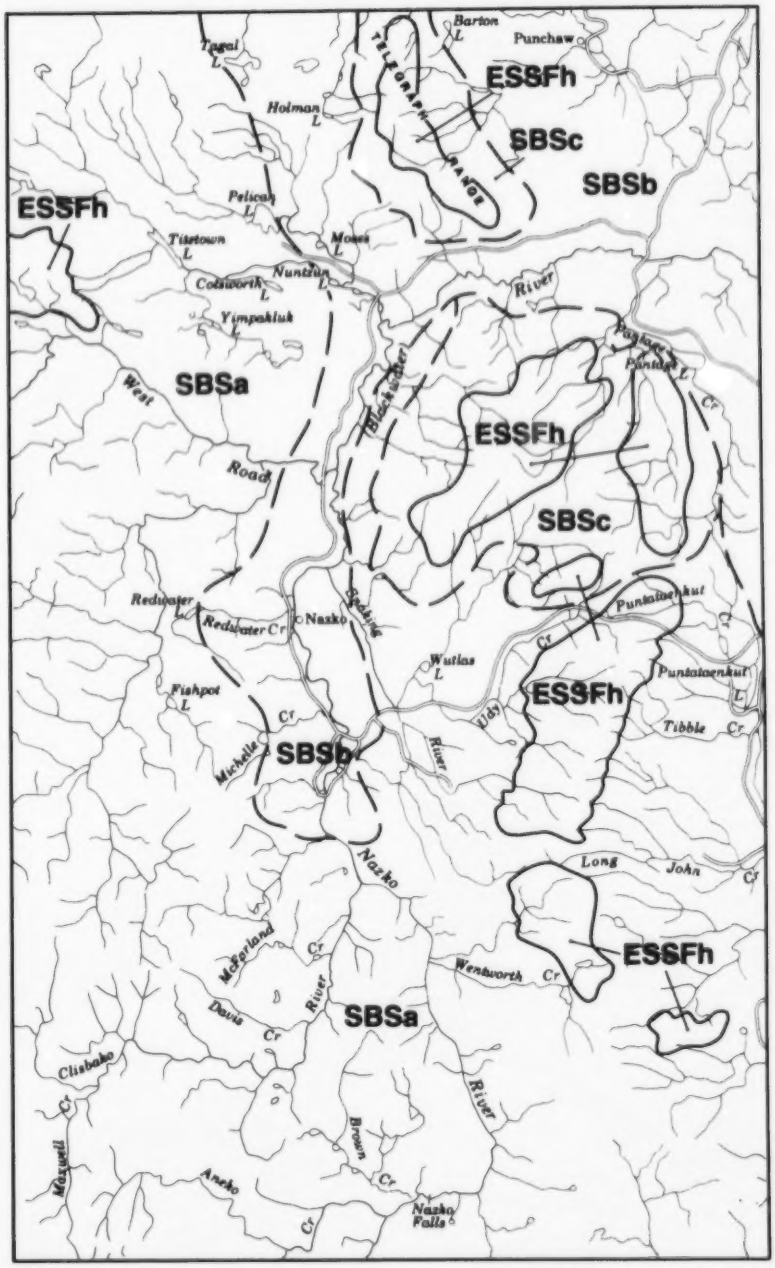

Figure 6. Biogeoclimatic zones. Map scale 1:600 000

Subboreal Spruce Zone

SBSa Chilcotin pine subzone
SBSb Douglas fir-white spruce subzone
SBSc white spruce-Engelmann spruce-Douglas fir subzone

Engelmann Spruce - Subalpine Fir Zone

ESSFh wet subzone

——— zone boundary
— — subzone boundary

Engelmann spruce - subalpine fir zone

At elevations generally greater than 1200 m is the wet subzone of the Engelmann spruce - subalpine fir zone (ESSFh). In the map area, this is generally restricted to isolated areas in the Telegraph Range and in the mountains southeast of the West Road River. Subalpine fir and Engelmann spruce (Picea engelmannii) are the dominant trees. The quite remarkably developed shrub layer includes white-flowered rhododendron (Rhododendron albiflorum), blueberries, Sitka mountain alder (Alnus viridis subsp. sinuata), and devil's club (Oplopanax horridus). Herbs are also well represented by Sitka valerian (Valeriana sitchensis subsp. sitchensis), oak fern (Gymnocarpium dryopteris), Canadian bunchberry, and simple-stemmed twistedstalk (Streptopus roseus).

SOILS

Mapping procedures

The soil survey of the Nazko area was one of several projects conducted under the Canada Land Inventory (CLI) program (Canada Land Inventory 1970) to provide information on soil resources for land capability ratings. Each of these projects, as does this one, had a common objective and well-defined guidelines (Working Group on Soil Survey Data 1983). As with previous projects, soil scientists made this survey to learn what kinds of soil and soil-like materials are in the survey area, where they are located and how they can be used. The soil scientists went into the area knowing they probably would locate many soils they already knew something about and perhaps identify some they had never seen before. They dug many holes, studied the soil profiles and gathered much data on factors such as: the steepness, length, and shape of slopes; drainage; parent materials; and the chemical and physical characteristics of the individual soil horizons. With these data in hand, as well as much more, the soil scientists undertook the task of mapping the distribution of the identified soils.

For detailed accounts of survey methods and mapping procedures used, the reader is referred to the following publications:

A Soil Mapping System for Canada : Revised (Mapping Systems Working Group, 1981)
The Soil Landscapes of British Columbia (Valentine et al. 1978)

For definitions of terms used in soil science, the reader is referred to:Glossary of Terms in Soil Science (Canada Soil Survey Committee, 1976).

The scale of the published soil maps is 1:100 000. Soils are classified and defined according to guidelines established by the Canada Soil Survey Committee (1978). The definition of soil association used in this report is the same as that in Soil Report No. 25 viz., that a soil association is a group of soils developed on similar parent materials, which differ because of different soil water regimes or because of variations in other characteristics. A soil association occurs when climatic conditions are similar, usually within one physiographic area or vegetation zone. Although a soil association is named after its most common soil, it may contain several other different but related soils. The full range of soils is not represented in every part of the landscape where a soil association occurs. Each soil association is shown on the map by one or more map units, each of which is given a particular combination ot letters and numbers.

There are two types of map units employed: a single map unit and a compound map unit. A single map unit contains soils from only one association whereas a compound map unit contains soils from two (or even three) associations.

For example a single map unit may be D (Deserters Association). This map unit represents dominantly deep, moderately well drained Luvisolic soils derived from gravelly loamy till occurring mainly in the Fraser Plateau. A compound map unit may be D-AX (Deserters-Alix associations). This map unit represents dominantly deep, moderately well drained soils derived from gravelly loamy till, with significant inclusions of gravelly, stony, rapidly drained soils derived from glaciofluvial materials (AX).

How to use this soil survey

The following is a brief guide to using the mapped information and report data. It is understood that as a consequence of the diversity of potential users and their individual needs, there will be other means of making use of this information. However, it is hoped that this section will help the first-time user of the report and maps.

1. Locate the area of interest on the map sheet.
2. List the mapping unit symbols that are in the area.
3. Turn to the list of the names of each soil association in the table of Contents and the page where the mapping unit is described.

4. See "Tables" (following the Contents) for location of additional data on a specific soil use or regional characteristic.
5. Consult "Land Use" and "Derived and Interpretive Maps" sections of the report for information on land capability and other potential uses of the mapped information.
6. For specific data on the chemical and physical characteristics of the soils, refer to "Appendix".

DESCRIPTION OF THE SOIL UNITS

ALIX Soil Units (AX)

Alix are sandy-skeletal soils developed on glaciofluvial materials that were deposited near lake margins. The soils occur on level to strongly sloping lands of stream valleys and basins below the general level of the plateau. The elevations range from 850 - 1200 m. The soils are dominant over 5.5% of the map area.

The mean annual precipitation is 300-400 mm. The freeze-free period is 30-74 days and there are 780-1309 growing degree-days above 5°C. Lodgepole pine is a common tree, but other species characteristic of the subboreal spruce zone--white spruce, Douglas fir, trembling aspen, and common paper birch--occur with a ground cover of blueberries, Oregon boxwood, pine grass, and mosses.

The parent material of the Alix soils is sandy-skeletal glaciofluvial material of variable thickness overlying till or bedrock. Although the predominant terrain form is a nearly level terrace, hummocky and kettled landforms occur. The soils are rapidly drained, are rapidly pervious, and have a subhumid to humid soil moisture regime.

The classification of the soils is Dystric Brunisol with the orthic subgroup dominating in some map units and the eluviated subgroup occurring in slightly moister environments. The more leached soils have a thin surface layer of grayish sandy loam. Subsoils are yellowish brown gravelly sandy loam overlying very gravelly material that may occasionally be calcareous. A complete profile description of an Eluviated Dystric Brunisol is from Soils of the Nechako-Francois Lake Area (Cotic et al. 1976).

Alix soils have many characteristics associated with other sandy-skeletal and gravelly soils mapped in or near near the area: Roaring soils of the Nazko area were mapped on complex esker-kame terrain; Ramsey soils are Podzolic.

The Alix soil units provide lodgepole pine pulpwood, and have potential for recreation and wildlife.

The Alix soils were first described in the Quesnel area by Mackintosh et al., in 1965 (unpublished manuscript).

Map units

AX Alix (38 618 ha): The AX map unit occurs mainly as narrow delineations along river and stream valleys. The deep, rapidly drained soils of the unit occur with small pockets of poorly drained mineral and Organic soils. Topography is generally smooth and level to gently sloping, but irregular, ridged, and kettled phases occur. Gully erosion may affect up to 20% of the map unit.

AX-CF Alix-Chief (2379 ha): The Organic soil (Chief) is complexed with Alix soils in this map unit where the very poorly drained secondary soils form a significant landform pattern, or where they occupy 30-40% of the unit. Elevation ranges are similar to those in the AX map unit but topography is more subdued.

BARRETT Soil Units (BA)

Barrett are gravelly, loamy soils developed on morainal materials on rolling and strongly sloping terrain. The soils occur in the central and northern parts of the map sheet at elevations from 850 to 1250 m. The association is dominant over 28% of the map area.

The mean annual precipitation is 300-400 mm. The freeze-free period is 30-74 days and there are 780-1169 growing degree-days above 5°C. Lodgepole pine is a common tree, but other species characteristic of the subboreal spruce zone--white spruce, Douglas fir, trembling aspen, and common paper birch--occur with a ground cover of blueberries, Oregon boxwood, pine grass, and mosses.

The parent material of the Barrett soils is gravelly, moderately stony, and neutral in reaction. The soils are moderately well to well drained, are moderately to slowly pervious, and have a humid to subhumid soil moisture regime.

The classification of the soils is Gray Luvisol with the orthic subgroup dominating in most areas and the brunisolic subgroup occurring in slightly moister environments. The soils have a thin surface layer of grayish sandy loam. Subsoils are grayish brown, gravelly loam that overlies gravelly loamy parent

material. A complete profile description of an Orthic Gray Luvisol of the Barrett Association is taken from Soils of the Nechako-Francois Lake Area (Cotic et al. 1976).

The present use for Barrett soils is the production of pulpwood and sawlogs.

The Barrett soils were first described by Farstad and Laird in 1954 (Report No. 4 of the B.C. Soil Survey).

Map units

BA1 Barrett 1 (84 509 ha): Topography ranges from undulating to strongly rolling in the map unit. Small amounts of soils such as Alix and Chief are included.

BA2 Barrett 2 (10 835 ha): This unit is associated with irregular terrain and significant components of gleyed soils.

BA3 Barrett 3 (62 719 ha): This map unit is distinguished by significant inclusions of Gleyed Gray Luvisols and Brunisolic Gray Luvisols.

BA-AX Barrett-Alix (51 563 ha); About 20-40% of the soils in this map unit are gravelly and sandy-skeletal Alix soils.

BEAVERLEY Soil Unit (BY)

Beaverley are fine-loamy and clayey soils developed on glaciolacustrine deposits. The terrain is nearly level to rolling with some steep eroded slopes. Elevations range from 700 m in the Blackwater valley to about 850 m near McLeese Lake. The soils predominate in less than 1% of the map area.

The mean annual precipitation is 300-400 mm. The freeze-free period is 60-119 days and there are 1170-1504 growing degree-days above 5°C. Lodgepole pine is a common tree, but other species characteristic of the subboreal spruce zone--Douglas fir, white spruce and trembling aspen are common trees that occur with a ground cover of herbs, pine grass, and mosses.

The parent material of Beaverley soils is a stratified fine-loamy glaciolacustrine deposit that is only weakly calcareous. Stones or gravel may occur where the lacustrine

mantle is shallow over till, especially near the higher elevation limits of the glacial lake basins. The soils are moderately well drained, are moderately pervious, and have a subhumid soil moisture regime.

The most common soils are Orthic Gray Luvisols. Beaverley soils have thick, grayish surface horizons that can usually be divided into upper and lower subhorizons. The brown, strongly structured subsoil horizons overlie distinctly stratified (varved) lacustrine parent material at depths between 50 and 85 cm. A complete description of an Orthic Gray Luvisol of the Beaverley Association is from a site near Quesnel (Lord and Mackintosh 1982).

A number of soil associations that occupy the extensive glacial lake deposits of the Fraser Basin are dominated by somewhat similar soils. These Gray Luvisols of the Berman, Beaverley, Narcosli, and Pineview associations are separated on the basis of criteria such as the texture of the parent materials, landform and climatic features, and soil profile characteristics. For the purpose of interpretive groupings most of these associations can be brought together.

Beaverley soils occur extensively in the Prince George-McLeod Lake map area north of Quesnel. The map unit provides wood for timber and pulp and where cleared is used for grain, hay, and pasture.

Beaverley soils were first described in the Quesnel area.

Map unit

BY Beaverley (5546 ha): The BY map unit occupies two areas near Pantage Lake. As much as 20% of the unit may be comprised of soils on organic materials and a further 20% may be other clayey lacustrine soils. Topography ranges from level to rolling; areas of strongly eroded soils occur along the valleys.

CHASM Soil Unit (CM)

Chasm are gravelly, loamy soils developed in colluvium on upper valley sides of the main rivers. Slopes range from moderate to very steep on elevations below 1000 m. These soils cover about 2.2% of the map sheet.

The mean annual precipitation is 300-400 m. The freeze-free period is 75-89 days and there are 1310-1504 growing degree-days above 5°C. Chasm soils are mainly in the subboreal spruce zone where lodgepole pine is a common tree over a ground cover of pine grass and shrubs such as willows, blueberries, and Oregon boxwood.

Chasm soils are moderately well drained, slightly hard, and moderately pervious, with a semiarid moisture regime. They are classified as Eluviated Eutric Brunisols that have a thin litter layer, and a calcareous subsoil and parent material. In some of these soils there is a layer of volcanic ash in the upper horizons. A profile from the Clinton area (Valentine and Schori 1980) is described in the Appendix.

These soils have moderate potential as spring range for cattle and provide winter habitat for wildife (mule deer).

Map unit

CM Chasm (16 267 ha): On the upper valley sides this unit includes rock outcrops and thin soils. Slopes vary from moderate to very steep.

CHIEF Soil Unit (CF)

Chief are deep soils developed from organic materials that are derived mainly from moss peat, often with significant inclusions of sedge peat. The soils occupy depressional or very gently sloping areas generally below elevations of 1200 m. The map units are mainly small and are distributed throughout the subboreal spruce zone of the plateau and basin regions. They are dominant over 3.3% of the map area.

The mean annual precipitation is 300-750 mm. The freeze-free period is 30-89 days and there are 780-1309 growing degree-days above 5°C. The fens are mostly nonforested, with a vegetative cover of sedges and grasses. Vegetation on bogs is black spruce, lodgepole pine, ericaceous shrubs, and mosses. The soils are very poorly drained and have an aquic moisture regime.

The Chief Association includes a wide range of organic materials in various states of decomposition. Most profiles are classified as Typic Mesisols but Fibrisols predominate in some areas. The surface tier of a typical profile is composed of

5-20 cm of fibric moss peat or sedge peat material that overlies more decomposed layers of dark brown, acidic organic materials.

Organic soils have been recognized and mapped since the days of the first soil surveys in the Interior Plateau (Kelley and Farstad 1946, Farstad and Laird 1954). At that time, three kinds of groundwater soils - muskeg, meadow, and shallow muck - were described in the Prince George area. Although some of these soils are still grouped under the name "Chief Association" in current reports, this association name is now used mainly to identify organic landforms in which Mesisols predominate.

Most of the Chief soils are used for wildlife and livestock grazing. Some map areas produce hay from native sedges or from seeded grasses.

Map unit

CF Chief (24 409 ha): Many small map delineations of this unit occur in the subboreal spruce zone. The map unit includes variable amounts of Humic Mesisol, terric subgroups, and Gleysols.

COTTONWOOD Soil Units (CN)

Cottonwood are coarse-loamy soils developed on glaciolacustrine and glaciofluvial materials deposited near lake margins. The soils occur on gently sloping to hummocky terraces and deltas associated with the Blackwater River. The elevations are less than 850 m. The soils are dominant over 4.1% of the map area.

The mean annual precipitation is 400-500 mm. The freeze-free period is 30-74 days and there are 780-1169 growing degree-days above 5° C. Lodgepole pine is common but other trees characteristic of the subboreal spruce zone--white spruce, Douglas fir, trembling aspen, and common paper birch--occur with a ground cover of blueberries, Oregon boxwood, pine grass, and mosses.

The parent material of the Cottonwood soils is nonstony, sandy loam to loamy sand but silty strata commonly occur at about one m from the surface. The soils are well to rapidly drained, are moderately pervious, and have a subhumid to humid soil moisture regime.

The classification of the soils is Dystric Brunisol with the orthic subgroup predominating in most areas. Brown fine sandy loam surface horizons overlie a thin loamy Btj horizon and a sandy textured C horizon. A complete profile descripton of an Orthic Dystric Brunisol from a site north of Blackwater is given in the Appendix.

Cottonwood soils were first described in the Blackwater River area. The soils provide pulpwood and are farmed to a limited extent.

Map units

CN Cottonwood (28 638 ha): Large areas south of the community of Punchaw and east of Pelican Lake have inclusions of organic soils as minor components. Steeply sloping and eroded terrain occurs along the Blackwater River.

CN-BY Cottonwood-Beaverley (2042 ha): The few areas of this map unit contain 20 - 40% of heavier textured, more poorly drained soils, often eroded and strongly sloping.

DESERTERS Soil Units (D)

Deserters are gravelly, loamy soils developed on morainal materials over topography that ranges from rolling to undulating. The elevations are from 750 m to about 1500 m. The Deserters map units are confined to the vicinity of Punchaw and Ramsey Creek where they occupy 4.2% of the map area.

The mean annual precipitation is 300-450 mm. The freeze-free period is 60-74 days and there are 1170-1309 growing degree-days above 5°C. Lodgepole pine is a common tree, but other species characteristic of the subboreal spruce zone--white spruce, Douglas fir, trembling aspen, and common paper birch--occur with a ground cover of blueberries, Oregon boxwood, pine grass, and mosses.

The parent materials of Deserters soils are sandy loams and sandy clay loam that are generally gravelly and greater than 1 m thick over bedrock. Areas of drumlinized landform adjacent to the shoreline zone of the former glacial lake may have 30 cm or more of gravelly, washed materials. Parent materials are mainly neutral and free of lime to depths of about 1 m. The soils are moderately well to well drained, are moderately to slowly pervious, and have a humid to subhumid soil moisture regime.

The dominant soils are Brunisolic Gray Luvisols, but Podzolic Gray Luvisols and gleyed subgroups are common. The soils have brownish surface horizons and grayish brown subsoils. A complete profile description of a Brunisolic Gray Luvisol is from Soils of the Prince George Area (Dawson, in preparation).

Soils of the Barrett Association are Orthic Gray Luvisols that occur on similar parent material to that of Deserters soils but under a slightly drier environment.

The soils are largely under forest that is currently being cut for pulpwood and sawlogs.

The Deserters Association was first identified and characterized in the Prince George area by Dawson (report in preparation).

Map units

D Deserters (17 552 ha): Most delineations of this map unit contain drumlinized terrain in which 15-30% of the soils may be sandy and gravelly. Orthic Gray Luvisols occupy the drier aspects.

D-DN Deserters-Dragon (13 602 ha): This map unit lies on upper slopes of ridges in the headwaters area of Baker and Ramsey creeks. It carries a significant component of Dragon soils that are developed on colluvium. These Humo-Ferric Podzols occur in the Engelmann spruce-subalpine fir zone. A profile description from Soils of the Nechako-Francois Lake Area (Cotic et al. 1976) is given in the Appendix.

ELLIOT Soil Unit (EL)

Elliot are fine loamy soils formed on fluvial sediments. Their topography is subdued with 0 to 5% slopes, over an elevation range from 800 to 1200 m. They cover less than 1% of the map sheet, mainly in the southern portion.

The mean annual precipitation is 300 - 400 mm or more. The freeze-free period is 30-49 days and there are 780-1029 growing degree-days above 5°C. Concentrated mainly in the subboreal spruce zone, the vegetation on Elliot soils, consisting of willows, sedges, and grasses reflects local wetness, not

regional climate. There are few trees, and shrubs such as willows (Salix spp.) and bog birch (Betula glandulosa) are restricted to upper slopes.

The soils are imperfectly and poorly drained, moderately pervious, with a perhumid moisture regime. They are classified as Rego Humic Gleysols, carbonated phase with water near the surface for most of the year. They are calcareous to the surface and have a thick, organic enriched, surface horizon. A profile described in the Lac la Hache area (Valentine and Schori 1980) is given in the Appendix.

Map unit

EL Elliot (2572 ha); Restricted mainly to narrow valleys and linear hollows, most delineations are small, irregular, and complexed with 20-40% Organic (Rail) soils.

ORMOND Soil Units (OD)

Ormond are gravelly, loamy soils developed in veneers of morainal and colluvial materials on rolling, hummocky, terrain. West of Quesnel these soils are associated with the Barrett soils. Elevations are from 1000 to 1350 m. Ormond soils occupy 4.3% of the map area.

The mean annual precipitation is 300-400 mm. The freeze-free period is 30-49 days and there are 780-1029 growing degree-days above 5°C. Most Ormond soils are in the Engelmann spruce-subalpine fir zone where these trees are common over a ground cover of blueberries, Oregon boxwood, and mosses.

The parent materials are shallow till or colluvium derived from basic volcanic rock types. The soils have thin leached surface horizons overlying a brownish subsurface. One of the common soils, a lithic phase Orthic Dystric Brunisol from Soils of the Nechako-Francois Lake Area (Cotic et al. 1976) is described in the Appendix.

Map units

OD Ormond (5784 ha): most areas contain about 30% Telegraph soils which are Brunisolic Gray Luvisols on gravelly loamy till.

OD-BA Ormond-Barrett (26 069 ha): The delineations of this map unit are on strongly rolling and steeply sloping land. The Orthic Gray Luvisol of the Barrett Association makes up 20-40% of the soils in the map unit.

RAIL Soil Unit (RL)

Rail are Organic soils developed on accumulations of moderately decomposed sedge peat. The terrain is level to undulating. These soils occur throughout the southern Fraser Plateau. They predominate in 1.4% of the map area.

The mean annual precipitation is greater than 426 mm, the freeze-free period is less than 49 days, and there are fewer than 1029 growing degree-days above 5°C.

In the map area Rail soils occur within the Chilcotin pine subzone of the subboreal spruce zone. The hydrophytic vegetation is dominated by sedges, reeds, grasses, willows, and herbs.

Parent materials of the Rail soils are moderately-decomposed organic material that has been derived from water-loving plants common to fen landforms; it is neutral to acid in reaction. The soils are very poorly drained, are moderately pervious, and have an aquic soil moisture regime.

The most common soils are Terric Mesisols. They have a mesic middle tier and are less than 160 cm in depth. A complete description of a Terric Mesisol, from the Clinton-Lac la Hache map area (Valentine and Schori 1980), is given in the Appendix. The Rail soils were first described in the Lac la Hache area.

Rail soils provide a source of hay and grazing for the cattle industry and browse for wild ungulates.

Map unit

RL Rail (10 318 ha): This unit may contain up to 20% inclusions of Gleysolic soils and deep (typic) Organic soils. Rail soils tend to be somewhat more decomposed, and include less moss-derived peat than Chief soils.

ROARING Soil Unit (RG)

Roaring are sandy-skeletal and coarse-loamy soils developed on steep, irregular slopes of glaciofluvial landforms that include eskers and crevasse fillings. The elevations range from 700-1000 m in the Nazko area. The soils are dominant in 1% of the area.

The mean annual precipitation is 400 mm or more. The freeze-free period is 30-74 days and there are 780 growing degree-days above 5°C. Lodgepole pine is a common tree, but other species characteristic of the subboreal spruce zone--white spruce, Douglas fir, trembling aspen, and common birch--occur with a ground cover of blueberries, Oregon boxwood, pine grass, and mosses.

The parent materials of the Roaring soils are thick deposits of sandy-skeletal glaciofluvial material. The predominant terrain form is steep-sided eskers occurring with hummocky and kettled landforms. The soils are rapidly drained, are rapidly pervious, and have a subhumid to humid soil moisture regime.

The classification of the soils is Eluviated Dystric Brunisol with the orthic subgroup dominating in some map units and Podzolic soils occurring in slightly moister environments. The more leached soils have a thin surface layer of grayish sandy loam. Subsoils are yellowish brown gravelly sandy loam overlying very gravelly material. A complete profile description of an Eluviated Dystric Brunisol is from Soils of the Nechako-Francois Lake Area (Cotic et al. 1976).

Roaring soils have many characteristics associated with other sandy- skeletal and gravelly soils mapped near the area: Alix soils are mapped on terraces; Ramsey soils are Podzolic.

The Roaring soil unit provides lodgepole pine pulpwood, and has potential for recreation and wildlife.

The Roaring soils were first described in the Quesnel area.

Map unit

RG Roaring (7552 ha): The RG map unit occurs near Nazko and in the valley of the Blackwater River. The deep, rapidly drained soils of the unit occur with small pockets of poorly drained, clayey or loamy textured mineral soils and

organic soils. Topography is generally irregular, ridged, and kettled phases occur. Gully erosion may affect up to 20% of the map unit.

SALT LAKE Soil Units (SY)

Salt Lake are coarse-loamy, gravelly and stony soils developed on loose, water-sorted materials that overlie compact till. The landform is hummocky terrain with gentle to moderate slopes. The elevation ranges from about 1000 to 1200 m in the upper Nazko River drainage. The association is dominant over 5.8% of the map area.

The mean precipitation is 300-400 mm. The freeze-free period is 30-89 days and there are 780-1309 growing degree-days above 5°C. The soils occur mainly in the subboreal spruce zone where an open forest of lodgepole pine and white spruce has an understory of rose, willows, kinnikinnick (Arctostaphylos uva-ursi), and pine grass.

Salt Lake soils are classified as Orthic Gray Luvisols. They are generally associated with Brunisols. Surface horizons are light gray or brownish fine sandy loam. Subsoils are compact, brownish, gravelly loams or sandy loams. A moderately calcareous horizon is usually present at some depth. The complete soil description in the Appendix is of an Orthic Gray Luvisol from near Alexis Creek.

Because of the nature of the materials and their origins, the map delineations of Salt Lake soils contain varying amounts of gravelly soils, mainly of the Alix Assocation and Organic soils (Chief).

Map units

SY Salt Lake (22 159 ha): The large delineations are mainly nearly level but some contain irregular, hummocky, kettled terrain. Some gravelly soils are included.

SY-AX Salt Lake-Alix (3885 ha): Alix and some similar soils comprise 20-40% of the unit.

SY-TE Salt Lake-Tyee (13 328 ha): This unit may contain greater than 40% Tyee soils on gentle smooth slopes that lie somewhat higher than the other Salt Lake units.

SY-CF Salt Lake-Chief (3841 ha): Chief soils comprise 20-40% of the unit that is characterized by a pattern of many small lakes, ponds, and potholes.

STELLAKO Soil Units (SL)

Stellako are sandy and silty soils developed on fluvial floodplain deposits. They occupy small areas of bottom lands along the Nazko, Baezaeko, and Chilako river systems. Elevations range from 750 to 1050 m on mainly level and undulating terrain. The map unit occupies less than 1% of the map area.

The mean annual precipitation is greater than 400 m. The freeze-free period is 30-74 days and there are 780-1139 growing degree-days above 5°C. Stellako soils are in the subboreal spruce zone where the local conditions favor the growth of white spruce, trembling aspen, white birch, moisture- loving shrubs and mosses.

Textures in the profile range from sandy loam to silt loam with some coarser and finer inclusions. These imperfectly to poorly drained soils are generally flooded in the spring. Stellako soils are classified as Gleyed Regosols and Gleysols. A description of a Gleyed Regosol, from Soils of the Nechako-Francois Lake Area (Cotic et al. 1976) is given in the Appendix.

Stellako soils are mainly under forest; minor areas are used for pasture or hay production.

Map unit

SL Stellako (5664 ha); About 20-40% of the unit may include Alix soils and minor amounts of Chief soils.

TELEGRAPH Soil Units (T)

Telegraph are stony loamy soils developed on compact morainal materials in steeply sloping mountainous terrain. They occur within the highest parts (to 1500 m) of the map area. The soils are dominant over 19.7% of the area.

The mean annual precipitation is 400-500 mm. The freeze-free period is 30-74 days and there are 780-1169 growing degree-days above 5°C. Lodgepole pine is a common tree, but other species characteristic of the subboreal spruce zone--white spruce, Douglas fir, trembling aspen, and common paper birch--occur with a ground cover of blueberries, Oregon boxwood, pine grass, and mosses.

The parent material of the Telegraph soils is gravelly, stony, and acid to neutral in reaction. The compact till is overlain by a somewhat looser, moderately coarse material. The soils are moderately well to well drained, are moderately to slowly pervious, and have a humid to subhumid soil moisture regime.

The classification of the soils is mainly Brunisolic Gray Luvisol. The soils have a thin surface layer of brownish sandy loam. Subsoils are grayish brown, gravelly loam that overlies compact loamy parent material. A partial description of an Eluviated Dystric Brunisol profile from a site in a large Telegraph map unit in the Wentworth Creek area is given in the Appendix.

The present use for Telegraph soils is the production of pulpwood and sawlogs.

Telegraph soils were first described in the Nazko area.

Map units

T Telegraph (71 735 ha): This unit includes variable amounts of gleyed soils, Orthic Gray Luvisols, and Dystric Brunisols.

T-OD Telegraph-Ormond (74 996 ha): A high percentage of shallow lithic phase soils are components of this unit, found on high mountain ridges and uplands.

TYEE Soil Units (TE)

Tyee are gravelly, loamy soils developed on morainal materials in the southern portion of the survey area. The terrain is mostly undulating and rolling with some moderate to strong slopes. Elevations range from 1000-1500 m. This extensive soil association is dominant over 6.9% of the map area.

The mean annual precipitation ranges between 426 and 566 mm, the freeze-free period is 30-59 days, and there are less than 1029 growing degree-days above 5°C. The Tyee soils occur in the subboreal spruce zone where lodgepole pine and white spruce predominate with Douglas fir and a ground cover of pine grass, herbs, and blueberries.

Parent materials of the Tyee soils are gravelly loam and clay loam deposits which are moderately calcareous. Stones and gravel occur frequently. Variable amounts of volcanic ash cover the soils or are incorporated in the upper part of the profile. The soils are moderately well drained, are moderately to slowly pervious, and have a humid to subhumid soil moisture regime.

The most common soils are Orthic Gray Luvisols. They have grayish surface horizons and compact, brown clay loam subsoils underlain by yellowish brown loam parent material. A complete description of a typical soil, from Soils of the Lac la Hache - Clinton Area (Valentine and Schori 1980), is given in the Appendix.

Soils of the Tyee units provide timber and grazing throughout the Cariboo area.

Tyee soils were first described and mapped in the Williams Lake area.

Map units

TE1 Tyee 1 (24 882 ha): This map unit predominates in the lower portions of the plateau area. The gently undulating landscape is dominated by Orthic Gray Luvisols with minor amounts of imperfectly drained soils.

TE3 Tyee 3 (2464 ha): On higher portions of the plateau the few areas of this unit contain some shallow or lithic phases of the Tyee soils.

TE4 Tyee 4 (23 933 ha): Soils in this map unit are dominantly lithic phase and are associated with rock outcrop on steeply sloping high elevation terrain.

VANDERHOOF Soil Unit (V)

Vanderhoof are clayey and loamy soils developed on glaciolacustrine clay sediments on mainly level and undulating terrain. These soils are mapped along the northern boundary area as the most southerly extension of the Vanderhoof laking basin. Elevations are below the 750 m contour. The map unit occupies 1.7% of the map area.

The mean annual precipitation is greater than 400 mm. The freeze-free period is 30-74 days and there are 780-1169 growing degree-days above 5°C. Lodgepole pine is a common tree, with other species characteristic of the subboreal spruce zone--white spruce, and trembling aspen, and blueberries, Oregon boxwood, pine grass and mosses occur as ground cover.

Silty clay loam and silty clays are common surface textures while clay and silty clays occur in the subsoil and parent material. The most common soil is Orthic Gray Luvisol, characterized by a thick, platy, leached horizon over an angular blocky subsoil and a varved parent material. The soils are moderately well to imperfectly drained. A description of a typical soil, from Soils of the Nechako-Francois Lake Area (Cotic et al. 1976) is given in the Appendix.

Vanderhoof soils are used for timber and farmed in areas that are suitable topographically.

Map unit

V Vanderhoof (12 709 ha): The map unit includes steep eroded lands along tributaries of the Chilako River.

WEST ROAD Soil Units (W)

West Road are stony, loamy and sandy soils developed on water-worked materials that overlie compact moderately fine textured morainal deposits. The soil units occupy hummocky, rolling, terrain at relatively low elevations (< 1200 m) centred at the junction of the Baezaeko and West Road rivers. The soils are dominant over 9% of the map area.

The mean annual precipitation is 400-500 mm. The freeze-free period is 30-74 days and there are 780-1169 growing degree-days above 5°C. Lodgepole pine is a common tree, but

other species characteristic of the subboreal spruce zone--white spruce, Douglas fir, trembling aspen, and common paper birch--occur with a ground cover of blueberries, Oregon boxwood, pine grass, and mosses.

The parent materials of the West Road soils are gravelly, stony, ablation deposits that are 1-1.5 m thick over compact basal till. The soils are moderately well to well drained, are moderately to slowly pervious, and have a humid to subhumid soil moisture regime.

The classification of the predominant soils is Orthic and Eluviated Dystric Brunisol but Orthic and Brunisolic Gray Luvisols are common in the map units. The soils have a surface layer of brownish sandy loam. Subsoils are grayish brown, gravelly loam that overlies gravelly sandy or loamy parent material. A complete profile description of an Eluviated Dystric Brunisol from a site near the junction of the West Road and Nazko rivers is given in the Appendix.

The present use for West Road soils is the production of pulpwood and sawlogs.

West Road soils were first described in the Nazko area.

Map units

W-AX West Road-Alix (13 980 ha): Alix soils occupy 40-50% of the map unit under hummocky, sag and swale topography. Chief soils commonly occupy 20% or less.

W-BA West Road-Barrett (49 906 ha): On moderately sloping land, Barrett soils may comprise 30-40% of the unit.

W-CF West Road-Chief (3108 ha): Chief soils occupy more than 20% of the unit.

LAND USE

As mentioned in the report section "Soils", the soil mapping reported on here was conducted under the auspices of the Canada Land Inventory (CLI) (Canada Land Inventory, 1970). The primary objective of this program was to determine and map the land or soil capability for various purposes. This mapping has been accomplished for the Nazko area. Published maps showing soil capability for agriculture are at a scale of 1:125 000. Land capability for forestry maps are published at the same scale. Capability for recreation and wildlife (waterfowl and ungulates on separate maps) are shown at a scale of 1:250 000. Present land use maps at a scale of 1:50 000 (in manuscript form) are also available. However, these maps have not recently been up-dated. The user of these capability maps should realize that at such small scales, the information is suitable for regional planning but is considered too generalized for detailed site evaluation.

Given the nature of soil mapping and the manner in which soil and map information is stored in computer files, it is possible to provide mapped and tabular information on a wide variety of land characteristics. Such characteristics could include, among others, texture groups, drainage, geologic materials, and wetlands. This report does not include such analyses. However, derivative and interpretive maps such as those described can be made available upon request to the Land Resource Research Centre, Vancouver, B.C.

The following sections on agriculture, forestry, wildlife (waterfowl and ungulates) and recreation provide brief supplementary information on soil or land capability of the study area. The reader is referred to the descriptive legends contained on the maps for informatin on the important factors and limitations used in the capability classifications.

Agriculture

Capability for agriculture, under the CLI system (Canada Land Inventory 1976), is controlled mainly by climate. Table 2 (taken from Air Studies Branch 1981) defines the climatic capability classes for the interior of British Columbia.

According to the soil capability for agriculture publications (Canada Land Inventory 1980, and Wiken 1979), approximately 70% of the area is comprised of climate classes 5 and 6, located mainly in the hilly and rolling areas where there are only 30 - 50 freeze-free days and 670 and 1029 growing degree-days. The lack of heat-units and low air temperatures

Table 2. Climatic capability for agriculture in interior British Columbia

	Freeze-free period (base 0°C) (days)	Growing degree-days (above 5°C)	Climatic moisture deficit[1] (mm)	Climatic moisture surplus ratio[2]
Class 1	90 - 119	1310 - 1504	< 40	< 0.33
Class 2	75 - 89	1170 - 1309	40 - 115	0.34 - 0.55
Class 3	60 - 74	1030 - 1169	116 - 190	0.56 - 0.75
Class 4	50 - 59	1030 - 1169	191 - 265	0.76 - 1.00
Class 5	30 - 49	780 - 1029	266 - 340	> 1.00
Class 6	< 30	670 - 779	341 - 415	-
Class 7	< 30	< 670	> 415	-

[1]Climatic moisture deficit: the negative difference between May-September precipitation and potential evapotranspiration.
[2]Climatic moisture surplus: the positive difference between May-September precipitation and potential evapotranspiration expressed as a ratio.

restrict these areas to the production of forage crops or native pasture. Climate class 4 occurs along the West Road, Euchiniko and Nazko river valleys as well as in the Pantage Lake area where growing degree-days range from 1030 to 1169 and there are 50 - 60 freeze-free days. Under these conditions, cereal crops are restricted mainly to oats and barley. Climate class 3 and a minor area of class 2 in the West Road valley, occupy about 10% of the area. These areas are suited to coarse grains, cool-season vegetables, and forage crops.

The most favourable soils for agriculture in the map area are limited to soil capability class 4, unimproved rating, but they are usually limited by climate, topography or both. Gray Luvisols developed on morainal or lacustrine materials are generally rated class 4, where stoniness or topographic factors are not limiting. Where limited by more severe topography or stoninesss, these soils are suitable only for forage crops, pasture or grazing. Podzolic and Brunisolic soils are generally restricted to classes 5 and 7 owing to severe limitations of topography and stoniness. Lithic phase soils are generally rated class 6 or 7 owing to severe climate or shallow depth to bedrock. Organic soils are shown on the Agriculture Capability map but are not rated. However, these are important for the ranching industry in the Cariboo since meadows can often be readily cleared and drained. Organic soils occur throughout the area in valley bottom locations. The reader is referred to the publication Land Capability Classification for Agriculture in British Columbia (Kenk and Cotic, 1983) for a description of the classification system used in rating organic soils.

Forestry

The text table outlines the land capability classes for forestry, based on a productivity range determined as the mean annual increment of the best species adapted to the site at or near rotation age (generally 100 years). The land capability for forestry maps (Wiken and Louie 1980, Wiken and Senyk 1980) show, for each map delineation, the land capability classes, limiting factors, and suitable species (Kowall 1983).

Class 4 is the dominant forest capability found mainly on Luvisolic and Podzolic soils developed on morainal parent materials. Minor areas of class 3 are found in the northeastern part of the area where lacustrine materials predominate, or at higher elevations where soil moisture conditions are more favourable. Small areas of class 2 occur on alluvial soils of the Baezaeko River. Classes 5 and 6 occur throughout the area, downgraded mainly by moisture limitations. Class 7 occurs on wetlands, mainly in the southern part of the map area.

Capability class	Wood productivity $m^3/ha/yr$
1	7.8 - 9.1 +
2	6.4 - 7.7
3	5.0 - 6.3
4	3.6 - 4.9
5	2.2 - 3.5
6	0.8 - 2.1
7	< 0.8

Wildlife

Ungulates

The main ungulate species in the area is moose; however, deer are also considered in some areas, particularly in the southeast and south-central portions of the map area. The highest capability for wildlife-ungulates (Blower et al. 1970, Mide and Mathews 1973) is class 1 land which occurs near Pantage Lake, Pelican Lake and along the floodplain of the Nazko River. Class 2 winter range occurs along the floodplain of the Nazko and West Road rivers as well as in isolated areas along Baezaeko and Punchaw creeks. Large areas of class 3 winter range occur in the south central, northwestern, and east central portions of the map area. The remainder of the area is considered a combination of Classes 3 and 4, with some class 5 occurring at higher elevations where excessively deep snow is the main limitation.

Waterfowl

As a consequence of topographic and climatic limitations, the capability of the lands in the area to produce or sustain waterfowl (Taylor and Carreiro, 1970, 1971) is generally rated in Classes 5 and 6, with most of the area rated as Class 7. Class 3 areas are located near Pelican Lake, Pantage Lake and Wutlus Lake, but these are generally small and isolated.

Recreation

The land capability for recreation maps (Yeomans 1969, Benn and Lebaron 1974) show that the moderate or better capability lands are confined almost entirely to valley bottomlands and lakes and their shorelines. These areas are generally rated in classes 2 and 3. Soils on morainal materials are generally rated as class 6 with some 5. High elevation areas are

generally rated as class 5 because only dispersed activities such as hiking and mountaineering are associated with these areas.

DERIVATIVE AND INTERPRETIVE MAPS

Agriculture Canada is able to produce maps based on the soil information presented here. These maps may be interpretive, such as those previously discussed under soil capability, or they may be derivative and based on the original soil mapping, such as those displaying surface texture, drainage, or slope classes. The maps can be produced because the original boundaries and map unit symbols are stored in a computer as part of the Canadian Soil Information System (CanSIS).

The capability to provide such maps is dependent on the data stored in the computer and methods available to interpret the data. The information produced by the computer is based solely on that which was initially entered. Therefore, no new map unit boundaries can be produced, whereas some can be deleted.

For further information, the reader should contact Agriculture Canada, Land Resource Research Centre, Vancouver.

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APPENDIX. DESCRIPTIONS AND ANALYSIS OF THE SOILS

This appendix lists, in alphabetical order, profile descriptions of most of the soils in the Nazko area. Some descriptions, with their accompanying chemical and physical data, were drawn from adjoining soil survey report areas, usually from where the soils were first named and described.

Standard methods of soil analyses (McKeague, 1976) were followed in the respective federal or provincial laboratories concerned with the survey projects. Further details are in soil survey reports or may be obtained from the specific agency.

ALIX SOIL

Location: 54°08'N 124°08'W | NTS: 93K1 | Surveyor: IC | Agency: BCMA, Kelowna, 1974

Identification: BC Soil Survey Report 22 | Classification: Orthic Dystric Brunisol (1978) | Landform and parent material: glaciofluvial, sandy, gravelly

Drainage: rapidly drained | Slope and aspect: level | Elevation: 880 m

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence
L-H	5-0				
Bm	0-17	yellowish brown (10YR 5/4 d)	sandy loam	weak, fine to medium subangular blocky	very friable
BC	17-28	pale brown (10YR 6/3 d)	gravelly sandy loam	weak, fine subangular blocky	very friable
IIC1	28-50	variegated	sandy fine gravel	single grain	loose
IIC2	50+	variegated	sandy fine gravel	single grain	loose

CHEMICAL AND PHYSICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C:N ratio	Cation exchange meq/100 g					Oxalate (%)		P1 (ppm)	P2 (ppm)	S (ppm)	Cu (ppm)	Zn (ppm)
					CEC	Ca	Mg	K	Na	Fe	Al					
L-H	4.1	58.0	1.52	37.7	83.6	21.2	6.4	3.0	0.1			60	136			
Bm	4.9	1.0	0.10	10.6	9.2	1.5	0.2	0.1	0.0	0.7	0.7	115	277	4	14	79
BC	5.0				6.0	1.9	0.2	0.1	0.0	0.5	0.4	146	227	2	20	80
IIC1	5.1				5.7	2.9	0.5	0.1	0.0	0.3	0.2	20	51	2	23	43
IIC2	5.1				5.8	3.0	0.7	0.2	0.0			9	25	2	24	43

BARRETT SOIL

Location: 54°17'N 125°44'W | NTS: 93F13 | Surveyor: IC | Agency: BCMA, Kelowna, 1974

Identification: BC Soil Survey Report 22 | Classification: Orthic Gray Luvisol (1978) | Landform and parent material: loamy morainal blanket

Drainage: moderately well drained | Slope and aspect: 18% S | Elevation: 1030 m | Additional notes: mottles are few, fine faint in ABgj horizon; clay skins are common in Btgj horizon and few in BC horizon; organic coatings occur in cracks in C1 horizon

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-H	5-0					
Ae1	0-12	light gray (10YR 7/2 d)	gravelly loam	moderate, coarse platy	friable	abundant
Ae2	12-25	light gray (10YR 7/2 d)	gravelly loam	moderate, fine-medium subangular blocky	friable	abundant
ABgj	25-32	light brownish gray (10YR 6.5/2 d)	gravelly loam	moderate, fine-medium subangular blocky	firm	abundant
Btgj	32-50	pale brown to brown (10YR 6/3-5/3 d)	gravelly clay loam	moderate, medium subangular blocky	firm	common
BC	50-85	brown (10YR 5/3 d)	gravelly clay loam	moderate, medium angular blocky	firm	few
C1	85+	brown (10YR 5/3 d)	gravelly clay loam	pseudo-blocky	very firm	very few

CHEMICAL AND PHYSICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C:N ratio	Cation exchange meq/100 g					Particle size distribution (%)				P1 (ppm)	P2 (ppm)	S (ppm)	Cu (ppm)	Zn (ppm)
					CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	Fine clay					
L-H	3.9	60.0	1.20	53.4	16.0	24.9	5.4	2.2	0.2					58	74	63	8	72
Ae1	5.2	0.6	0.04	14.2	9.2	3.8	1.3	0.2	0.1	46	40	14	7	24	67	5	10	70
Ae2	5.1	0.4	0.03	14.2	10.4	4.7	1.7	0.2	0.1					18	118	4	12	51
ABgj	5.0	0.3	0.03	10.6	18.1	9.5	3.6	0.3	0.3					14	130	4	12	56
Btgj	5.1	0.4	0.03	13.0	27.0	14.8	6.0	0.4	0.2	28	38	34	15	9	115	5	30	64
BC	6.0	0.3	0.02	13.8	27.6	16.3	6.7	0.4	0.2	30	40	30	12	3	223	6	32	68
C1	6.7									32	39	29	12	3	275	4	31	71

BEAVERLEY SOIL

Location: 52°50'N 122°26'W
Lot 959, S of Dragon Lake

NTS: 93B16

Surveyor: TL

Agency: AC, Vancouver, 1982

Identification: BC Soil Survey Report 31

Classification: Orthic Gray Luvisol (1978)

Landform and parent material: clayey glaciolacustrine blanket

Drainage: moderately well drained

Slope and aspect: 5% N

Elevation: 600 m

Additional notes: volcanic rock types; rooting depth to 70 cm

Vegetation: Douglas fir, trembling aspen, white spruce, kinnikinnick, twin flower, Oregon grape

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-H	3-0					
Ae	0-8	brown (10YR 4/3 m)	silt loam	weak, coarse platy	hard, firm	plentiful, fine, random
BA	0-16	brown (10YR 4/3 m)	clay loam	strong, medium subangular blocky	very firm	few, fine, random
Bt	16-44	dark brown (10YR 3/3 m)	clay	weak, coarse columnar	firm	few, fine, random
BC	44-69	dark brown (10YR 3/3 m)	silty clay	moderate, medium angular blocky	very firm	very few, fine, random
C1	69+	dark brown (10YR 3/3 m)	clay	very coarse pseudo-platy and angular	very firm	very few, fine, random

CHEMICAL AND PHYSICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Cation exchange meq/100 g					Particle size distribution (%)				P1
				CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	Fine clay	(ppm)
Ae	6.2	1.5	0.11		10.3	3.0	1.1	0.1	7	54	39	5	54
Bt	5.3	0.6	0.07		17.0	9.8	1.1	0.5	1	24	75	23	22
BC	5.8			27.5	14.9	8.4	0.6	0.5	1	45	54	11	8

CHASM SOIL

Location: 51°04'21"N 121°23'57"W

NTS: 92P3

Surveyor: AS

Agency: AC, Vancouver

Identification: BC Soil Survey Report 25

Classification: Eluviated Eutric Brunisol (1978)

Landform and parent material: colluvial veneer

Drainage: moderately well drained, moderately pervious, semiarid

Slope and aspect: 35% SE

Elevation: 1050 m

Additional notes: some volcanic ash in upper horizons; moderate effervescence in IICk horizon

Vegetation: Douglas fir-ponderosa pine-bluebunch wheatgrass regenerating seral community; Interior Douglas fir zone

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-F-H	2-0					
Ae	0-5	grayish brown (10YR 5.5/2 d)	loam	weak, fine platy	soft	plentiful, fine
Btj	5-30	brown (10YR 4.5/3 d)	loam	moderate, medium subangular blocky	slightly hard	plentiful, fine
Bm	30-43	grayish brown (10YR 5/2.5 d)	loam	weak, fine subangular blocky	slightly hard	plentiful, fine
IICk	43-114	pale brown (10YR 6/2.5 d)	gravelly loam	weak, fine subangular blocky	friable	very few, fine

COTTONWOOD SOIL

Location: 53°20'00"N 123°07'50"W | NTS: 93G6 | Surveyor: TL | Agency: AC, Vancouver, 1984

Identification: BC Soil Survey Report 38 Lot No. 1485, S of Punchaw | Classification: Orthic Dystric Brunisol (1978) | Landform and parent material: glaciofluvial-glaciolacustrine, sandy

Drainage: well drained | Slope and aspect: level 2-5% | Elevation: 750 m

Vegetation: lodgepole pine, Douglas fir, pine grass, mosses

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
F	1-0					
Ae	0-1	very dark grayish brown (10YR 3/2.5 m)	loam	strong, fine platy	very firm	few, medium
Bm	1-18	dark yellowish brown (10YR 3/4 m)	fine sandy loam	very weak, fine granular	very friable	few, coarse
AB1	18-49	dark brown (10YR 3/3 m)	sandy loam	very weak, medium subangular blocky	friable	very few, coarse
Btj1	49-50	brown (7.5YR 4/2 m)	sandy loam	weak, medium angular blocky	firm	
AB2	50-87	brown (10YR 4/3 m)	loamy sand	strong, fine platy	very firm	
Btj2	87-89	dark yellowish brown (10YR 3/4 m)	loam	very weak medium subangular blocky	firm	
C1	89+	very dark grayish brown (2.5YR 3/2 m)	loamy sand			

CHEMICAL AND PHYSICAL DATA

Horizon	pH in $CaCl_2$	Cation exchange meq/100 g					Particle size distribution (%)			Pyrophos. (%)	
		CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	Fe	Al
Bm	5.3	11.3	3.2	1.3	0.5	0.0	56	39	5	0.3	0.2
Btj1	5.6	13.5	5.4	2.8	0.4	0.0	77	16	7		
C1	5.9	9.4	4.2	2.1	0.3	0.0	87	11	2		

DESERTERS SOIL

Location: 53°42'N 122°49'W | NTS: 93G10 | Surveyor: AD | Agency: BCMA, Kelowna

Identification: BC Soil Survey Report 23 | Classification: Brunisolic Gray Luvisol (1978) | Landform and parent material: loamy morainal blanket

Drainage: moderately well drained | Slope and aspect: 22% W | Elevation: 925 m

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-H	2-0					
Ae	0-2	light gray (10YR 7/2 d)	sandy loam	single grain	loose	abundant
Bm	2-17	brown (10YR 5/3 d)	sandy loam	weak, fine subangular blocky	soft	abundant
AB	17-50	light brownish gray (10YR 6/2 d)	gravelly sandy loam	moderate, medium subangular blocky	slightly hard	plentiful
BA	50-75	light brownish gray (10YR 6/2 d)	gravelly loam	moderate, medium-coarse subangular blocky	hard	few
Bt	75-100	brown (10YR 5/3 d)	gravelly loam	strong, coarse angular blocky	firm	few
BC	100-120	brown (10YR 5/3 d)	gravelly loam	massive	very firm	

CHEMICAL AND PHYSICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Cation exchange meq/100 g					Oxalate (%)		P1 (ppm)
				CEC	Ca	Mg	K	Na	Fe	Al	
L-H	4.9	50.0	1.2								111
Ae	4.2	1.3	0.6	8.7	1.9	0.7	0.3	0.1			60
Bm	4.6	0.8	0.4	8.6	1.9	1.1	0.2	0.1	0.6	0.3	110
AB	4.8	0.4	0.2	6.5	2.3	0.7	0.2	0.1			42
BA	4.9	0.1	0.2	6.7	2.7	0.9	0.1	0.1			9
Bt	5.5	0.1	0.2	12.5	6.8	2.6	0.2	0.1			6
BC	6.7			13.1	8.3	3.2	0.1	0.2	0.4	0.3	2

DRAGON SOIL

Location: 54°00'N 124°50'W | NTS: 93J15 | Surveyor: IC | Agency: BCMA, Kelowna, 1974

Identification: BC Soil Survey Report 22 | Classification: Orthic Humo-Ferric Podzol (1978) | Landform and parent material: shallow sandy colluvium, acidic bedrock

Drainage: rapidly drained | Slope and aspect: 20% SE | Elevation: 1230 m | Additional notes: many of the Dragon soils have less than 50 cm of colluvial or morainal material overlying bedrock and are classified as lithic phase

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-H	5-0					abundant
Ae	0-5	light gray (10YR 7/1 d)	sandy loam	weak, fine subangular blocky	loose	abundant
Bf1	5-7	yellowish brown (10YR 5/4 d)	sandy loam	moderate, fine-medium subangular blocky	very friable	abundant
Bf2	7-20	yellowish brown (10YR 5/4 d)	sandy loam	moderate, fine-medium subangular blocky	very friable	abundant
BC	20-45	brown (10YR 5/3 d)	gravelly sandy loam	moderate, fine-medium subangular blocky	very friable	common
C	45-55	light brownish gray (10YR 6/2 d)	gravelly sandy loam	pseudo-platy	friable	very few
R	55+					

CHEMICAL AND PHYSICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C:N ratio	Cation exchange meq/100 g					Oxalate (%)		P1 (ppm)	P2 (ppm)	S (ppm)	Cu (ppm)	Zn (ppm)
					CEC	Ca	Mg	K	Na	Fe	Al					
L-H	3.9	60.0	1.2	31.1	107.0	22.4	2.9	2.0	0.0			42	54		9	42
Ae	3.7	1.6	1.1	27.5	12.3	2.4	0.3	0.2	0.0			7	14	8	3	19
Bf1	5.5*	1.7			14.1	1.4	0.2	0.2	0.0	0.9	0.6	51	99	9	8	48
Bf2	6.0*	1.5	0.1	23.3	13.5	1.4	0.2	0.1	0.0	0.9	0.9	44	93	9	13	52
BC	6.0*				7.8	0.7	0.1	0.1	0.0	0.5	0.5	30	70	6	16	26
C	6.1*									0.4	0.3	28	62		17	25

* in water

ELLIOT SOIL

Location: 51°57'39"N 121°47'53"W

NTS: 92P13

Surveyor: KV

Agency: AC, Vancouver, 1980

Identification: BC Soil Survey Report 25

Classification: Rego Humic Gleysol, carbonated phase (1978)

Landform and parent material: fluvial, fine loamy

Drainage: imperfectly drained, moderately pervious

Slope and aspect: level

Elevation: 850 m

Additional notes: small amounts of marl in H horizon

Vegetation: sedges, arrow grass, smooth brome, water hemlock

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-F-H	5-0	black (2.5Y 2/0 m)		structureless		
Ahk1	0-8	black (2.5Y 2/0.5 m)	silt loam	structureless	slightly sticky, slightly plastic	abundant
H	8-13	black (2.5Y 2/0 m)		structureless	very sticky, plastic	abundant
Ahk2	13-33	very dark gray (2.5Y 3/0 m)	silty clay loam	structureless	very sticky, plastic	few
Ckg	33-75	dark gray (5Y 4/1 m)	silty clay loam	structureless	very sticky, plastic	few

CHEMICAL AND PHYSICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C:N ratio	Cation exchange meq/100 g				
					CEC	Ca	Mg	K	Na
L-F-H	6.9	35.6	2.9	12.2	118.1	119.1	50.9	2.0	4.7
Ahk1	7.2	7.9	0.5	14.9	34.3	150.3	32.5	1.3	3.9
H	7.0	26.9	2.1	12.8	117.8	208.3	47.9	1.4	5.2
Ahk2	7.6	4.6	0.3	13.9	31.4	157.9	23.9	1.3	3.9
Ckg	7.5	1.5	0.1	12.5	30.1	33.5	16.9	1.3	2.6

ORMOND SOIL

Location: 54°08'N 124°38'W | NTS: 93K2 | Surveyor: IC | Agency: BCMA, Kelowna, 1974

Identification: BC Soil Survey Report 22 | Classification: Orthic Dystric Brunisol, lithic phase (1978) | Landform and parent material: shallow loamy colluvium

Drainage: rapidly drained | Slope and aspect: 14% NE | Elevation: 930 m | Additional notes: bedrock is basalt

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-H	5-0					
Bm1	0-7	brown (10YR 5/3 d)	gravelly sandy loam	weak-moderate, subangular blocky	very friable	abundant
Bm2	7-17	brown (10YR 5/3 d)	gravelly loam	weak-moderate, subangular blocky	very friable	abundant
Bm3	17-27	brown (10YR 5/3 d)	gravelly loam	weak, fine subangular blocky	slightly hard	abundant
C	27-45	pale brown (10YR 6.5 5/2 d)	gravelly loam	pseudo-platy	hard	
R	45+					

CHEMICAL AND PHYSICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C:N ratio	Cation exchange meq/100 g					Oxalate (%)		P1 (ppm)	P2 (ppm)	S (ppm)	Cu (ppm)	Zn (ppm)
					CEC	Ca	Mg	K	Na	Fe	Al					
L-H	4.2	7.2	1.6	19.6	44.7	15.3	3.8	1.4	0.1			10	187		14	64
Bm1	4.8	9.2	0.9	11.1	17.9	3.2	0.7	0.6	0.0	0.8	0.9	88	150	7	14	9
Bm2	4.8	2.6	0.3	11.6	16.6	2.2	0.6	0.2	0.0	0.8	0.9	104	194	5	15	71
Bm3	4.7	1.7	0.2	11.0	16.5	3.0	1.5	0.2	0.0	0.7	0.7	119	242	9	16	64
C	4.9	1.0	0.1	8.5	12.6	3.8	2.3	0.2	0.1	0.6	0.5	54	159	8	12	45

RAIL SOIL

Location: 51°58'22"N 121°27'06"W | NTS: 92P14 | Surveyor: KV | Agency: AC, Vancouver, 1980

Identification: BC Soil Survey Report 25 | Classification: Terric Mesisol (1978) | Landform and parent material: organic blanket

Drainage: very poorly drained | Slope and aspect: level | Elevation: 1175 m | Additional notes: ponded; seepage present; decomposition: OM1, OM2, OM3 slightly decomposed, OH moderately decomposed; woody material in OM3 horizon is 2 cm size and 20% of volume

Vegetation: sedges, willows, ground birch, mosses, reeds

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence
Om1	0-36	very dark grayish brown (10YR 3/2 m)			
Om2	36-61	very dark brown (10YR 2.5/4 m)			
volcanic ash	61-64	pale brown (10YR 6/3 m)	sandy loam	structureless	nonsticky
Om3	64-114	dark brown (10YR 4/3 m)			
Oh	114-145	very dark gray (10YR 3/1.5 m)			
Cg	145-180	greenish gray (5BG 5/1 m)	silty clay loam	structureless	slightly sticky

CHEMICAL AND PHYSICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Cation exchange meq/100 g					Particle size distribution (%)				Bulk Density
				CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	Fine clay	
Om1	6.3	43.0	3.0	133.9	63.1	22.2	1.1	2.5					0.15
Om2	5.8	44.4	3.1	141.3	73.6	22.5	0.1	1.1					0.15
volcanic ash	5.9	7.5	0.5	21.8	12.5	3.5	0.1	0.3	56	41	3	1	
Om3	5.7	41.5	2.7	153.2	80.7	24.1	0.2	1.1					0.14
Oh	5.5	41.2	1.8	205.2	127.4	35.7	0.3	1.1					0.17
Cg	6.6	0.5	0.0	14.7	8.9	4.2	0.8	0.2	44	37	19	6	

ROARING SOIL

Location: 54°21'N 124°17'W | NTS: 93K1 | Surveyor: IC | Agency: BCMA, Kelowna, 1974

Identification: BC Soil Survey Report 22 | Classification: Orthic Dystric Brunisol (1978) | Landform and parent material: gravelly glacio-fluvial, esker

Drainage: rapidly drained | Slope and aspect: 25% S | Elevation: 830 m

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-H	2-0					
Ah	0-2	dark grayish brown (10YR 4/2 d)	gravelly loamy sand	weak, medium granular	soft	abundant
Bm	2-10	dark brown (10YR 3/3 d)	gravelly loamy sand	weak, fine subangular blocky	soft	abundant
C1	10-35	variegated	gravelly sand	single grain	loose	abundant
C2	35+	variegated	gravelly sand	single grain	loose	abundant

CHEMICAL AND PHYSICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C:N ratio	Cation exchange meq/100 g					P1	P2	S	Cu	Zn
					CEC	Ca	Mg	K	Na	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
L-H	5.4	36.0	3.1	30.2	78.0	56.4	7.2	3.4	0.1	69	135		15	179
Ah	5.5	2.6	1.6	17.5	14.5	8.2	1.4	1.3	0.0	112	574	5	13	137
Bm	5.1	1.3	0.1	13.6	10.6	4.4	0.5	0.6	0.0	155	500	9	14	129
C1	5.9				9.1	4.4	0.5	0.4	0.0	59	288	1	14	71
C2	5.8				7.1	3.7	0.6	0.4	0.0	23	48	1	18	59

SALT LAKE SOIL

Location: 52°09'N 123°14'W | NTS: 93B3 | Surveyor: TL | Agency: AC, Vancouver, 1984

Identification: BC Soil Survey Report 53 | Classification: Orthic Gray Luvisol (1978) | Landform and parent material: silty/coarse loamy morainal, undulating

Drainage: well drained, slowly pervious | Slope and aspect: level 3% | Elevation: 1100 m | Additional notes: Beaver Lake forest access road, north of Siwash Lake; the distinct change in texture at 40 cm indicates a coarser underlying material

Vegetation: lodgepole pine, trembling aspen, pine grass; regeneration is pine under an open canopy

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-F	2-0	fibrimor				
Ae	0-8	brown (7.5YR 5/2 m)	silt loam	weak, fine-medium platy	friable, firm	few-plentiful, fine
AB	8-16	dark brown (7.5YR 4/2 m)	silt loam	weak, medium subangular blocky	friable	few, medium
Bt	16-31	dark brown (10YR 4/3 m)	clay loam	moderate, medium subangular blocky	firm	very few, fine
BC	31-40	dark grayish brown (10YR 4/2.5 m)	loam	weak, medium angular blocky	friable	very few
IIC1	40+	olive brown (2.5Y 4.5/2 m)	gravelly sandy loam	weak, pseudo-blocky	friable	

CHEMICAL AND PHYSICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Cation exchange meq/100 g					Particle size distribution (%)			P1 (ppm)
				CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	
Ae	5.8	0.7	0.0	12.5	4.4	2.2	0.5	0.0	25	62	13	13
Bt	5.8	0.5	0.0	25.3	9.1	6.0	0.5	0.1	33	35	32	27
IIC1	6.1			6.8	3.0	1.7	0.1	0.0	70	24	6	14

STELLAKO SOIL

Location: 54°05'N 125°03'W | NTS:93J3 | Surveyor: IC | Agency: BCMA, Kelowna, 1974

Identification: BC Soil Survey Report 22 | Classification: Gleyed Regosol (1978) | Landform and parent material: loamy fluvial floodplain

Drainage: imperfectly drained | Slope and aspect: 5% NE | Elevation: 750 m | Additional notes: many fine, prominent mottles (5YR 4/4 d) occur in all horizons

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-F	2-0					
Cgj1	0-5	brown (10YR 5/3 d)	silt loam	structureless	slightly hard	abundant
Cgj2	5-12	brown (10YR 5/3 d)	silt loam	structureless	slightly hard	common
Cgj3	12-19	brown (10YR 5/3 d)	silt loam	structureless	slightly hard	common
Cgj4	19-25	yellowish brown (10YR 5/4 d)	silt loam	structureless	very friable	common
Cg1	25+	yellowish brown (10YR 5/4 d)	silt loam to fine sandy loam	structureless	very friable	occasional

CHEMICAL AND PHYSICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C:N ratio	Cation exchange meq/100 g					P1 (ppm)	P2 (ppm)	S (ppm)	Cu (ppm)	Zn (ppm)
					CEC	Ca	Mg	K	Na					
L-F	5.7	49.1	1.8	27.8	93.6	54.6	25.9	6.6	0.3	175	244	58	14	178
Cgj1	5.2	1.8	0.1	16.3	12.4	5.1	4.0	0.5	0.2	3	136	1	18	52
Cgj2	5.5	1.2			12.9	5.6	5.4	0.2	0.2	2	132	1	19	52
Cgj3	5.8									2	150	2	18	56
Cgj4	6.4									2	144	1	15	49
Cg1	6.7									1	151	5	16	52

TELEGRAPH SOIL

Location: 52°43'N 123°14'W | NTS: 93B11 | Surveyor: TL | Agency: AC, Vancouver, 1984

Identification: BC Soil Survey Report 38 | Classification: Eluviated Dystric Brunisol (1978) | Landform and parent material: gravelly coarse-loamy, morainal

Drainage: well drained | Slope and aspect: 18% N | Elevation: 1540 m | Additional notes: site 27 Sep.20/84 in Wentworth River valley

Vegetation: Englemann spruce, lodgepole pine, trembling aspen, pine grass; some Douglas fir regeneration

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture
L-F	2-0		
Ae	0-4		
Bfj	4-6	dark reddish brown (5YR 3/4 m)	
Bm	6-12	dark brown (7.5YR 3/2 m)	gravelly silt loam
BC	12-18		gravelly sandy loam
C1	18+	grayish brown (2.5Y 5/2 m)	gravelly loam

CHEMICAL AND PHYSICAL DATA

Horizon	pH in $CaCl_2$	Cation exchange meq/100 g					Particle size distribution (%)			P1
		CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	(ppm)
Bm	4.4	16.4	1.4	0.7	0.4	0.1	38	53	9	58
BC	5.0	10.7	3.2	2.0	0.3	0.1	51	43	6	17
C1	5.4	10.9	3.6	2.9	0.4	0.1	52	39	9	6

TYEE SOIL

Location: 52°13'20"N 122°03'24"W | NTS: 93B1 | Surveyor: WS | Agency: AC, Vancouver, 1966

Identification: BC Soil Survey Report 25 | Classification: Orthic Gray Luvisol (1978) | Landform and parent material: morainal blanket

Drainage: moderately well drained | Slope and aspect: 5% SE | Elevation: 1000 m | Additional notes: LFH horizons consist of slightly decomposed leaves (20%) and needles (80%); the Bt horizon has many, moderately thick clay films in pores, channels, and on ped faces

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-F-H	3-0	forest litter				
Ae	0-18	light gray (10YR 7/2 d)	sandy loam	weak, fine granular	very friable	plentiful, exped
AB	18-28	light brown, gray (10YR 6/2 d)	loam	moderate, fine subangular blocky	firm	plentiful, exped
Bt	28-50	yellowish brown (10YR 5/4 d)	loam	moderate-strong, fine subangular blocky	firm	plentiful, exped
IIBC	50-76	pale brown (10YR 6/3 d)	gravelly loam	moderate, medium subangular blocky	firm	plentiful, exped
IIC	76-100	pale brown (10YR 6/3 d)	gravelly loam	moderate, medium pseudo-blocky	friable	few, exped
IICk	100-120	grayish brown (2.5Y 5/2 d)	gravelly loam	moderate, medium pseudo-blocky	friable	very few, exped

CHEMICAL AND PHYSICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	Cation exchange meq/100 g					Particle size distribution (%)			
				CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	Fine clay
L-F-H	4.7		0.4	48.0	23.9	5.0	1.4	0.2				
Ae	4.4	0.5	0.0	8.2	3.0	1.0	0.2	0.1	49	45	6	2
AB	4.9	0.6	0.0	15.0	8.1	3.6	0.4	0.1	43	39	18	8
Bt	5.6	0.4	0.0	24.0	14.2	7.8	0.6	0.1	38	46	16	13
IIBC	6.2	0.2	0.0	19.4	12.2	6.5	0.5	0.1	43	33	24	6
IIC	6.4	0.1	0.0	16.9	11.1	5.2	0.4	0.1	45	33	22	6
IICk	7.3	0.1	0.0	15.4	23.0	4.3	0.3	0.1	45	33	22	6

VANDERHOOF SOIL

Location: 54°03'N 123°58'W | NTS: 93J3 | Surveyor: IC | Agency: BCMA, Kelowna, 1974

Identification: BC Soil Survey Report 22 | Classification: Orthic Gray Luvisol (1978) | Landform and parent material: clayey lacustrine blanket

Drainage: well to moderately well drained | Slope and aspect: 4% SW | Elevation: 765 m | Additional notes: the Bt horizons have many clay skins

PROFILE DESCRIPTION

Horizon	Depth (cm)	Color dry (d) moist (m)	Texture	Structure	Consistence	Roots
L-H	1-0					abundant
Ae	0-3	light brownish gray (10YR 6/2 d)	silty clay loam	medium to coarse platy	slightly hard	abundant
AB	3-5	light brownish gray (10YR 6/2 d)	silty clay loam	moderate, coarse platy	hard	abundant
BA	5-8	light brownish gray (10YR 6/2 d)	silty clay	strong, coarse columnar	hard	common
Bt1	8-15	brown (10YR 4/3 d)	silty clay	strong, coarse prismatic	hard	common
Bt2	15-20	brown (10YR 4/3 d)	silty clay	strong, coarse prismatic	hard	few
BC	20-29	brown (10YR 5/3 d)	silty clay	moderate, fine to medium angular blocky	hard	occasional
C	29+	grayish brown (10YR5/2 d) and brown (10YR 4/3 d)	silty clay	stratified	hard	

CHEMICAL AND PHYSICAL DATA

Horizon	pH in $CaCl_2$	Organic C (%)	Total N (%)	C:N ratio	Cation exchange meq/100 g					Particle size distribution (%)				P1	S
					CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	Fine clay	(ppm)	(ppm)
L-H	6.5	38.3	1.8	41.6	101.9	51.0	18.8	3.5	0.8					129	
Ae	5.6	2.2	0.2	13.6	20.4	7.6	4.8	0.8	0.1	5	63	32	2	166	1
AB	5.5	0.7	0.1	9.4	12.4	4.2	3.8	0.4	0.1					41	
BA	5.4	0.7	0.1	15.3	18.1	5.6	1.7	0.5	0.2	1	50	49	12	8	5
Bt1		0.6	0.1	14.3	22.8	7.0	11.1	0.4	0.4	1	45	54	15	3	5
Bt2	6.2	0.5	0.1	16.6	25.5	7.2	12.2	0.4	0.5	1	46	53	15	2	7
BC	6.9				26.1	7.2	14.1	0.3	0.9	0	47	53	13	2	8
C	7.4				23.2	8.5	14.2	0.3	1.1	0	52	48	12	1	9

WEST ROAD SOIL

Location: 53°09'N 123°31'W | NTS: 93B12 | Surveyor: TL | Agency: AC, Vancouver, 1984

Identification: BC Soil Survey Report 38 | Classification: Eluviated Dystric Brunisol (1978) | Landform and parent material: gravelly sandy morainal

Drainage: rapidly drained | Slope and aspect: level | Elevation: 900 m

Vegetation: lodgepole pine, kinnikinnick, blueberries, lichens, and white spruce regeneration

PROFILE DESCRIPTION

Horizon	Depth (cm)	Texture	Structure	Consistence
L-F	2-0			
Ae1	0-2		very weak, granular	very friable
Bm	2-14	silt loam	weak, subangular blocky	friable
Ae 2	14-22	sandy loam		
Btj	22-39	gravelly sandy loam	weak, medium subangular blocky	friable, firm
BC	39-45	sandy loam		
C1	45+	sandy loam	single grain	loose

CHEMICAL AND PHYSICAL DATA

Horizon	pH in $CaCl_2$	Cation exchange meq/100 g					Particle size distribution (%)			P1
		CEC	Ca	Mg	K	Na	Sand	Silt	Total clay	(ppm)
Bm	5.1	15.2	3.5	1.5	0.4	0.0	36	56	8	168
Btj	5.9	13.1	5.2	2.8	0.4	0.0	57	35	8	18
C1	6.0	9.0	3.8	2.0	0.2	0.1	72	24	4	8

MAPS
NOT
FILMED

CARTES
OMISES